ADSL2+ Bonded Installation and Repair Guide – Legacy EQ

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1.0 TARGET AUDIENCE

1.1 *Functional workgroup(s) impacted by this Method and Procedure:*

Workgroup	Workgroup	Workgroup
Business Operations	Central Office	Consumer Installation and Repair/SBHB

1.2 *Additional workgroup(s) impacted by this Method and Procedure:*

Workgroup	Workgroup	Workgroup

2.0 PRODUCT OVERVIEW

Overview:

CENTURYLINK has developed a new High Speed Internet offering to remain competitive in the market place. In September 2009, Business sales channels began offering 15/1.5 Mb, 20/2 Mb, 25/2 Mb product to all classes of business customers. In order to deliver the higher speeds, CenturyLink introduced a new DSL technology: ADSL2+ Bonded. ADSL2+ Bonded HSI service consists of installing two ADSL2+ lines to the customer's premise, and then through special software/configuration within the DSLAM and modem/gateway, the individual DSL lines are combined to perform as one. Both lines are prefielded prior to installation to ensure pristine lines. The technology allows for higher speed offerings while maintaining a reasonable customer serving area (up to 10kft from serving device). ADSL2+ Bonded HSI is only available out of DSL devices that have Ethernet feeding the device's transport.

Effective December 21st, 2009, CenturyLink expanded its sales footprint of ADSL2+ Bonded HSI service to include Residential (COS 11) Customers. The residential product offering consists of a single "up-to" 25Mb price-point. However, for loop stability and support reasons, each residential customer will be qualified and provisioned at one of the following speed profiles: 15/1.5 Mb, 20/2 Mb, 25/2 Mb (**NOTE: these are the exact same profiles as our Business offering**). From an installation and troubleshooting perspective there is no difference between residential and business customers.

- S&E codes are the same across both Business and Residential
- Installation of a Cisco DDR2200 Gateway is required for both Business and Residential
- The minimum acceptable throughput policy is 80% or greater of the quoted speed (15/1.5 Mb, 20/2 Mb, 25/2 Mb) for both Business and Residential

The ADSL2+ Bonded offering is available in Ethernet transport grade DSLAMs where the DSLAM is capable of supporting the bonded technology. At this time those sites are limited to customer serving areas supported by the following DSLAMs:

CALIX E5-11x
CALIX C7
ADTRAN TA5000
ADTRAN TA1x48 with 1x00F Ethernet Uplink
ADTRAN TA1x48A with 1x00F Ethernet Uplink (coming soon)
TELLABS UMC-1000 (coming soon)

All ADSL2+ Bonded orders are supported as full installs and tested with the JDSU HST-3000 test set via an automated D.A.T.A.✓ test script. This test script has been built specifically to test ADSL2+ Bonded HSI speed offerings.

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ADSL2+ Bonded HSI National Standard & Product Implementation Checklist:

CATEGORY	DESCRIPTION
Product Offering – Bonded HSI	(HSI downstream/upstream quoted speeds) ▪ 15/1.5 Mb ▪ 20/2.0 Mb ▪ 25/2.0 Mb
Protocol	DHCP
S&E Codes	FHSBxxx, where "B" = Bonded and xxx = the speed (015, 20M or 25M)
Key Word	\Bonded
MEDR	▪ Min. 8000 = 15Mb ▪ Min. 10000 = 20Mb ▪ Min. 12500 = 25Mb
TOS	TOS Code page (look for "COPPER-HSI-BONDED" under Description): http://eqip.corp.intranet/portal/server.pt/gateway/PTARGS_0_0_12531_0_0_43/http:/eqippub1.corp.intranet/published content/publish/eqip_content/cm_qsource_handbook/qsource/solutions/products/hsi/presale_information/articles/tos_code_table.html?qid=85293249&rank=1
Static IP Availability	▪ Residential Customers – Single Static IP ▪ Business Customers – Up to 8 Static IPs ▪ Only on Adtran TA5000, TA11x8 & Calix C7 (Calix E5 does not support Static IP at this time)
DSLAM Requirements	Adtran TA5000, TA1x48 (with 1x00F Ethernet uplink), Calix E5, Calix C7 (Ethernet Fed Only), *Tellabs UMC-1000 (coming soon!)*
Customer Premise Equipment	Cisco DDR2200 gateway
Loop Length Offering	▪ 15/1.5 Mb – 10kft ▪ 20/2.0 Mb – 8kft ▪ 25/2.0 Mb – 7kft
Skillset in WFM	BONDED
Skillset in NIBS	BONDADSL2
Skillset Requirements	Completion of Self, Full, & Bonded installation training
Pre-Fielding Ticket Type	50
Trouble Ticket Type	70
Pre-fielding Requirements	Both pairs must be groomed to full capabilities (no bridge tap or load coils) and pass pre-fielding guidelines
Install Type	Full Install
Time Reporting - Activity Type	1206 - HSI In-Home Install
Filter or Splitter	Splitter
Test Equipment	HST-3000 Test-set with ADSL2+ Bonded D.A.T.A.✓ Test Script (Version 4.1 or greater)
Technician Training	Bonded HSI Overview – Elearn Course # 101714 (online, self-paced)
Documentation	Refer to the Associated Documents section of this M&P

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<table>
<tr><td>DSLAM Profiles</td><td>
<table>
<tr><th colspan="6">CenturyLink Bonded ADSL2+ HSI Sync Rates (No Prism) - All DSLAMs</th></tr>
<tr><th rowspan="2">Bonded HSI Speed</th><th rowspan="2">Maximum Loop Length</th><th colspan="2">Rate per Port (At Frame)</th><th colspan="2">Rate per Customer (At Frame)</th><th>Minimum Acceptable Sync Rate per port (At customer premise)</th></tr>
<tr><th>Down</th><th>Up</th><th>Down</th><th>Up</th><th>Down</th></tr>
<tr><td>15M/1.5M (FHSB015)</td><td>10kft</td><td>8832</td><td>896</td><td>17664</td><td>1792</td><td>7Mbps</td></tr>
<tr><td>20M/2M (FHSB20M)</td><td>8kft</td><td>11776</td><td>1152</td><td>23552</td><td>2304</td><td>9Mbps</td></tr>
<tr><td>25M/2M (FHSB25M)</td><td>7kft</td><td>14720</td><td>1152</td><td>29440</td><td>2304</td><td>11.5Mbps</td></tr>
</table>
</td></tr>
<tr><td>Materials Needed</td><td>▪ HST-3000 Test-set
▪ D.A.T.A.✓ software version 4.1 (or greater)
▪ Cisco DDR2200 Gateway</td></tr>
<tr><td>Technician Support Number(s)</td><td>(800) 452-0535 (Programming/Assignment) and (800) 603-8044 Option 3,1 (BMC)</td></tr>
<tr><td>Metric Report Requested</td><td>Yes</td></tr>
<tr><td>Product Summary</td><td>▪ Virtual bonding of 2 consecutive ports (1&2, 3&4), always odd/even
▪ Enhanced DSLAM & CPE; CPE and DSLAM perform bonding
▪ Requires ADSL2+ card in DSLAM
▪ Requires clean lines with NO errors, up to 10kft (no bridge taps or load coils, only 3M-UY scotchloks, etc)
▪ Dial tone goes on first (odd) pair
▪ Mandatory full install and mandatory splitter (on line with dial tone)
▪ Aggregated through an Alcatel-Lucent (ALU) 7750 Router
▪ Required: ADSL2+ module, DATA Check 4.1 software, Cisco DDR2200 gateway
▪ CAT5 Jumpers installed at Frame from LEN to DSLAM
▪ CAT5 Homerun installation from NID to serving jack
▪ All orders require a 5-day due date to perform grooming activities</td></tr>
</table>

2.1 *Revisions:*

Issue	Section	Revision Summary
7	2	Added new DSLAMs that support Bonded ADSL2+ and correct DATA Check software version of 4.1.
7	15	Added Time Coding section
7	17	Added Technical Support Group number under Contacts section
8/9	2	Updated Product Summary section and corrected min. MEDRs/loop length
8/9	5	Added link to Business Order Entry/Sales Info
8/9	6.3	Updated Sync Rate Table
8/9	12	Added Helpful Troubleshooting Tips
8/9	19	Added Gateway Placement Info document to Appendix
8/9	11.7	Updated default SSID and Encryption info
10	2	Updated Skillset and Product Summary sections of table
10	5	Added link to Bonded HSI Cheat Sheet
10	15-18	Added new sections: Customer Downgrade/Denial process, Upgrade process, Cancellation process, No Access Policy

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10	9	Added section for Manual ADSL2+ Auto Testing at NID

3.0 GENERAL

3.1 Roles and Responsibilities:
The following table lists workgroup(s) responsible for implementing the Method and Procedure.

Workgroup	Job Function Performed

3.2 ***Compliance:***
This practice is mandatory as written.

3.3 ***Adopted for Use:***
This practice has been adopted for use in the following business units/divisions of CENTURYLINK.
(a) Network Services

4.0 EFFECTIVE DATE

Effective Date	Expiration Date
08/26/2009	Until Further Notice

5.0 ASSOCIATED DOCUMENTS

5.1 Related Documents:
Documentation relating to this Method and Procedure include the following:

Document Name	Document Number or Link
ADSL2+ Bonded HSI Cheat Sheet	http://nsl.corp.intranet/hsdata/broadband/ADSL2_plus_Bonded_HSI_Cheat_Sheet.pdf
Consumer Order Entry & Sales Info (Up to 25Meg HSI)	EQSource - Solutions - Data Services - HSI - 25M
Business Order Entry & Sales Info (15, 20 & 25Meg HSI)	http://smallbiz.corp.intranet/sbhbhandbook/HSI_Higher_Speeds
Pre-Field Testing, Completion & Denial Process (Bonded-VDSL-IPTV)	http://nsl.corp.intranet/ncs_practices/2010/mp_2010_03_020.pdf
ADSL2+ Bonding Assignment	http://nsl.corp.intranet/ncs_practices/2009/mp_2009_08_003.pdf
Central Office Frame procedures	http://nsl.corp.intranet/ncs_practices/201/100_901.pdf
Calix C7 Programming	http://nsl/ncs_practices/2010/mp_2010_05_003.pdf
Calix E5 Programming	http://nsl.corp.intranet/ncs_practices/2010/mp_2010_03_013.pdf
Dispatch Process: Pre-Fielding RRS Ticket	http://nsl.corp.intranet/ncs_practices/2010/mp_2010_03_016.pdf
Delayed Order Notification (DON)	http://nsl.corp.intranet/ncs_practices/682/001_001.pdf
Single Pair Connector - Materials and Use	http://nsl.corp.intranet/ncs_announcement/2010/ga_2010_07_001.pdf
Prism Video Supply List (Truck Stock)	http://nsl.corp.intranet/IPTV/IPTV_VIDEO_SUPPLY_LIST.pdf
Prism Technician Cheat Sheet - Bonded/IPTV	http://nsl.corp.intranet/hsdata/broadband/Pre_fielding_ADSL2_Bonded%20_IPTV.pdf
Ordering HSI Equipment in CART	http://nsl.corp.intranet/ncs_jobaid/2010/ja_2010_02_008.pdf
Prism Installation & Repair Guide	http://nsl.corp.intranet/ncs_practices/2009/mp_2009_06_001.pdf

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6.0 Service and Equipment Information

Speed	Master	Suffix	Description
15M	**FHSB015**	xRB	CENTURYLINK DSL 15Mb/1.5Mb Dynamic IP
15M	**FHSB015**	xSB	CENTURYLINK DSL 15Mb/1.5Mb Static IP
5M	**FHSISFL**	xAN	15Mb/1.5Mb CENTURYLINK Portal
20M	**FHSB20M**	xRB	CENTURYLINK DSL 20Mb/2.0Mb Dynamic IP
20M	**FHSB20M**	xSB	CENTURYLINK DSL 20Mb/2.0Mb Static IP
20M	**FHSISHL**	xCN	20Mb/2.0Mb CENTURYLINK Portal
25M	**FHSB25M**	xRB	CENTURYLINK DSL 25Mb/2.0Mb Dynamic IP
25M	**FHSB25M**	xSB	CENTURYLINK DSL 25Mb/2.0Mb Static IP
25M	**FHSISJL**	xAN	25Mb/2.0Mb CENTURYLINK Portal
xxM	**FHSDHCS**	xxx	PROVISIONING CODE Splitter
xxM	**FHSDHCF**	xxx	PROVISIONING CODE Filter

CPE	Master	Suffix	Description
Gateway	**BHSCISS**	VID	Cisco DDR2200 BONDED ADSL2+ Gateway

NOTE: “x” indicates a field that has several variables

6.1 *Engineering and Facility Assignment overview*

Bonded ADSL2+ requires the assignment of two consecutive (ex. Ports 1 and 2, 3 and 4, etc.) ADSL2+ ports, two fully groomed (no bridge-tap or load coils) office and field pairs, from the serving device to the customer premise. All bonded ADSL2+ service orders will fail to the local facilities teams (ENG/FAL) via the ARC assigned key word of \BONDED for manual assignment. The ENG/FAL will perform a loop make up, review the make up, identify any bridge-tap or load coils present in the loop and issue the appropriate work activity or ticket to remove all load coils and bridge-taps on the customer’s loops. Grooming work activity should include all grooming activity from the central office or remote device to the last MPOE (Minimum Point of Entry)/Demarcation (NID) at the customer location.

6.2 *Provisioning responsibilities*

Provision the individual DSL ports with the specified speeds and bond the pairs per provisioning M&P. See below for speed tiering and provisioning rates

CenturyLink Bonded ADSL2+ HSI Sync Rates (No Prism) - All DSLAMs						
Bonded HSI Speed	**Maximum Loop Length**	**Rate per Port (At Frame)**		**Rate per Customer (At Frame)**		**Minimum Acceptable Sync Rate per port (At customer premise)**
		Down	**Up**	**Down**	**Up**	**Down**
15M/1.5M (FHSB015)	10kft	8832	896	17664	1792	7Mbps
20M/2M (FHSB20M)	8kft	11776	1152	23552	2304	9Mbps
25M/2M (FHSB25M)	7kft	14720	1152	29440	2304	11.5Mbps

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7.0 Central Office Responsibilities

Central Office Technicians and/or Frame Attendants will be responsible for wiring two ADSL2+ ports so the bonded service can be utilized, and performing testing (using your HST-3000) to ensure good physical line statistics at each wired port. This process consists of wiring both ports (will be assigned consecutively) in the same manner as single DSL ports are wired today. Bonded ADSL2+ orders will include two C001, D001, F001, and F002 fields indicating the ports and office pairs that are assigned to a particular customer order. See example below.

```
- ASGN
I C001   /CKT 702-614-0394-BOND/WRC HDNV/COS 98/IZ HD02/TZ 5/SC 1/DEV D
I D001   /CKT 702-614-0394-BOND/WRC HDNV/DSLAM HNSNNVXFL40/SHELF 001
         /CARD 003/PORT 00010/VPI 0656/VCI 0048/MEDR 000015001
         /AIDR 000015001/AGGR LSVGNV80V14/VERT 112.0004/ASLOT 009
         /APORT 00001/AVPI 0656/AVCI 0048/RTID HNSNNVXFL40
I F001   /C001/CA 13/PR 1198/BP 00098/TER 215784/TLOC BASIC & WATER ST
I F002   /C001/CA 27K/PR 0232/BP R-O/BC W-BL/TER R59 E BASIC RD
I MISC   /C001/HSN 000057/FRAC BND/DIR E/SNM BASIC/TYP RD/UNIT B/COMM HEND
         /EXCH LVGS/ST NV
  INFO   /RMK USE VACANT FACILITIES
         /RMK CHANGE SERVICE WITH HIGH SPEED DATA
I C001   /ATN 702 614-0394/WRC HDNV/COS 21/SW 7P/LT HOST18 0 01 28/PTY 1
         /TR SL/SNCL HNSNNVXFDS0/IZ HD02/TZ 5/SC 1/DEV D
I        /LM PORT 9-10
I D001   /ATN 702 614-0394/WRC HDNV/DSLAM HNSNNVXFL40/SHELF 001/CARD 003
         /PORT 00009/VPI 0656/VCI 0044/MEDR 000015001/AIDR 000015001
         /AGGR LSVGNV80V14/VERI 112.0004/ASLOT 009/APORT 00001/AVPI 0656
         /AVCI 0044/RTID HNSNNVXFL40
I F001   /C001/CA 13/PR 1181/BP 00081/TER 215784/TLOC BASIC & WATER ST
I F002   /C001/CA 27K/PR 0231/BP R-BL/BC W-BL/TER R59 E BASIC RD
I MISC   /C001/HSN 000057/DIR E/SNM BASIC/TYP RD/UNIT B/COMM HEND
         /EXCH LVGS/ST NV
  INFO   /RMK REUSE FACILITIES FOR OUT AND IN ACTIONS
         /RMK CHANGE PORT FOR HIGH SPEED DATA
         /RMK 10-26-09 BIAP RMVL RQUST SUBMITD UUV1236 5:00P
         /RMK \FA VIEWED
```

ASSIGNMENT SECTION

- **TWO C001 SECTIONS**
- Provides customer telephone number
- 2nd pair indicated by keywords CKT & BOND
- Provides LEN Assignment
  - LT HOST 18
- **TWO D001 SECTIONS**
- Provides SHELF/CARD/PORT
  - SHELF 1, CARD 3, PORTS 9 & 10
- **TWO F001 SECTIONS**
- Provides Cable & Pair information

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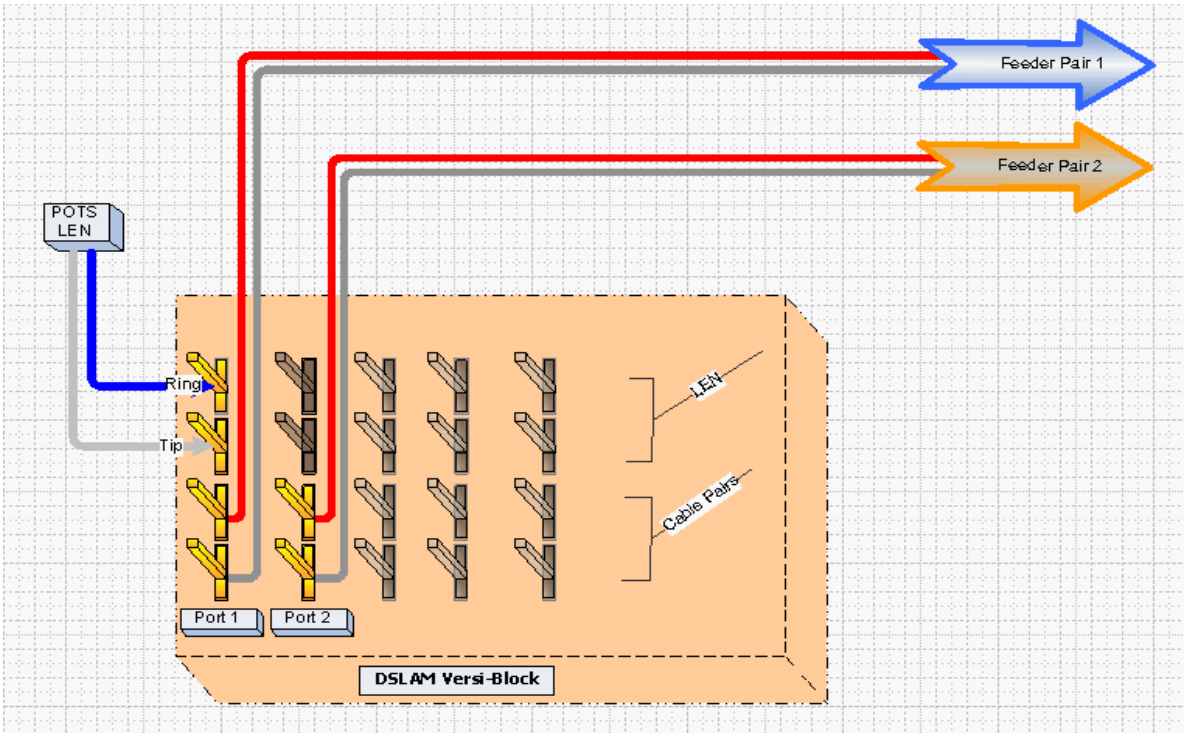
Frame wiring example



7.1 Central Office Port Testing:

- It is preferred that all technicians utilize the D.A.T.A.✓ Bonded Test script (as outlined in section 9 of this M&P) to perform testing on Bonded ADSL2+ lines. Even if the technician does not have access to a Cisco DDR2200 Gateway and thus can't upload results, the script will provide a summary page providing the combined sync rate, attenuation, and noise margin. If using the manual testing procedure the technician will have to keep track of the test results for both ports and manually calculate.
- If the technician has access to a Cisco DDR2200 Gateway, it is **required** that the technician uses the D.A.T.A.✓ Bonded Test script as shown in section 9 of this M&P to perform testing **and upload results.**
- **Guidelines for Good Physical Statistics when testing from the frame;**
  - Test each port for sync – rate should be equal to or close to provisioned rate.
  - Noise Margin must be at least 9db (should average between 15-20db at the frame)
  - Attenuation should be minimal to non-existent (0-5db)

7.2 Manual Test Procedure:

- Power on test set
- Choose ADSL soft key (2nd key from left)
- Choose ADSL Modem Emulate
- Follow existing manual testing process
  - Link to HST-3000 Manual Testing Instructions document: http://nsl.corp.intranet/ncs_practices/2006/mp_2006_09_004_attach1.pdf

8.0 Field Technician Responsibilities

Install two DSL lines at customer premise. Line one includes a working phone number, which should be splittered at the customer premise. Line two will not include dial tone at this time, so no splitter is needed. A category 5 home run should be installed when possible to further isolate the DSL signal from the existing premise wiring.

The technician is also responsible for testing each DSL line for sync and errors, at the NID, as well as inside the premises (see sections 9 and 10 of this M&P which communicates how to perform a manual ADSL2+ Auto test at the NID and how to run the D.A.T.A✓ bonded testing script inside the premises) and configuring the Cisco DDR2200 Bonded ADSL2+ gateway.

All Bonded DSL trouble reports will be issued under Report Type 70 (DSL - Bonded). These tasks will only be sent to Full Install and Bonded capable technicians. Follow normal DSL trouble shooting procedures for each port/pair assigned on the customer's service.

Materials Required:

The following equipment is required to perform the installation and testing of ADLS2+ Bonded HSI.

- **Cisco DDR2200 Gateway** – required CPE to be installed at the customer premise
- **HST-3000 Test set with ADSL2+ Bonded Automated Test Script –** required test set/script to perform installation testing and troubleshooting

Training Required:

Any "full-install" technician targeted to perform the installation or troubleshooting of ADSL2+ Bonded HSI must first complete the following self-paced course;

- Bonded HSI Overview (101714)
- To enroll in this course, type "elearn" in your web browser and search for this course by clicking on search catalog
- Upon successfully completing this course, the technician's supervisor should contact dispatch to have the technician's skill set updated

9.0 MANUAL ADSL2+ AUTO TEST AT NID

Manually review the physical line statistics (Noise margin, Attenuation, sync rates, errors, etc.). Test DSL signal at the NID (on both DSL lines if Bonded). Below are the steps to perform the manual test on the HST-3000 test set.

A.	Power on the HST-3000.
B.	From main screen select the ADSL soft key.
C.	Select OK or press 1 for the ADSL MODEM.
D.	ADSL Summary screen displays.
E.	Select CONFIGURE.
F.	Scroll down to STANDARD.
G.	Select OK.
H.	Scroll down to **ADSL2+ Auto**. Note: You may have to scroll to the next page to find this option.
I.	Select OK.
J.	Cancel out of screen.
K.	Allow HST-3000 to run for **5 -10 minutes**.
L.	Check for Synch, Up and Down Actual Rate.

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M.	Check Max Rate, Capacity, Noise Margin, and Attenuation. ADSL2+ Auto displays in the upper right hand corner of the screen.
N.	Press display soft key.
O.	Scroll to Error line and press OK or press the 2 button.
P.	The FEC, CRC and HEC error screen displays.

HST-3000 returns to main screen and in upper right corner ADSL2+ Auto displays. **Monitor results for 5 – 10 minutes.**

10.0 D.A.T.A.✓ TESTING PROCEDURE & ACCESSING SAVED TEST RESULTS

ADSL2+ BONDED HSI Testing Procedure:

ADSL2+ BONDED service testing is performed with the JSDU/Acterna HST-3000 test set via the Bonded ADSL Test Script. Steps required to perform this test include, testing each individual DSL pair/port for good physical statistics then completing the test by connecting the test set to the ADSL2+ Bonded Gateway to administer a Ping & FTP test. Please review the table below for the complete testing procedure.

NOTE: The ADSL2+ Bonded D.A.T.A. ✓ testing process does leverage both the DSL Line port (located on the right side of the HST) as well as the Ethernet port (located on the top of the HST).

- The technician will use the DSL Line port (side of HST) to test the physical line statistics (i.e. sync rate, noise margin, attenuation) of both pair one and pair two. This is no change from single line testing performed today, only the test is performed twice.
- The technician will then use the Ethernet port (top of unit) to perform the FTP and Ping portions of the test as well as to complete the job close-out. The HST must be connected to the back of the gateway via an Ethernet cord.

Step	Action
1	Connect DSL Pair 1 to the DSL Line Port on the side of the test unit
2	Press the **Auto Test** button and select **EMBARQ Bonded ADSL**

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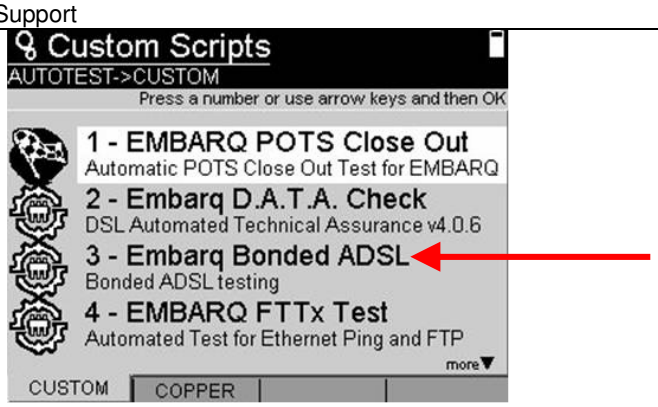
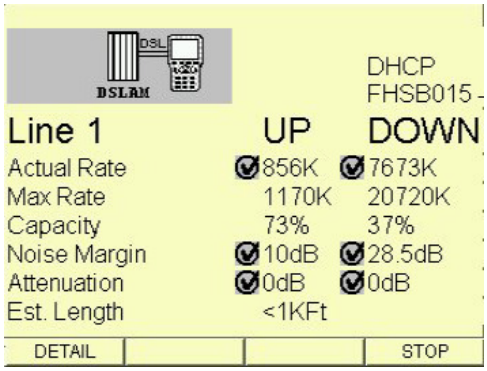
	
3	Select the speed on the customer's account/order ▪ FHSB015 – 15/1.5 ▪ FHSB20M – 20/2.0 ▪ FHSB25M – 25/2.0
4	Press OK and allow the script to run. It will test the physical line statistics of Pair 1; ▪ Sync Rate ▪ Noise Margin ▪ Attenuation
5	A Summary Screen will appear recapping which portions of the test on Pair 1 passed or failed.  **Click OK**
6	The test set will prompt you to connect Pair 2
7	Connect DSL Pair 2 to the DSL Line Port on the side of the test unit

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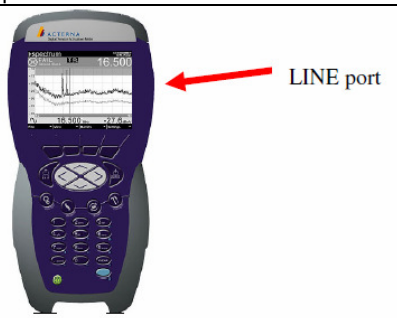
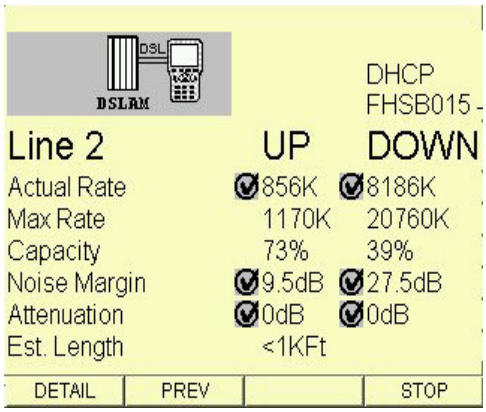
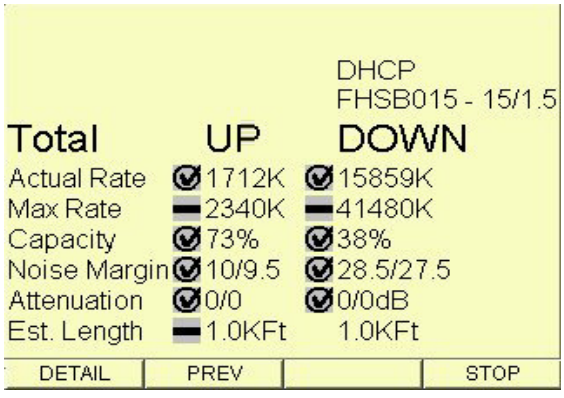
	
8	**Press OK** and allow the script to run. It will test the physical line statistics of Pair 2; ▪ Sync Rate ▪ Noise Margin ▪ Attenuation
9	A Summary Screen will appear recapping which portions of the test on Pair 2 passed or failed.  **Click OK**
10	The test set will now auto-calculate and display a Summary Screen illustrating the combined test results and which portions of the test passed or failed. 
11	The test set will now prompt you to connect the Ethernet cord to perform both a Ping & FTP test.

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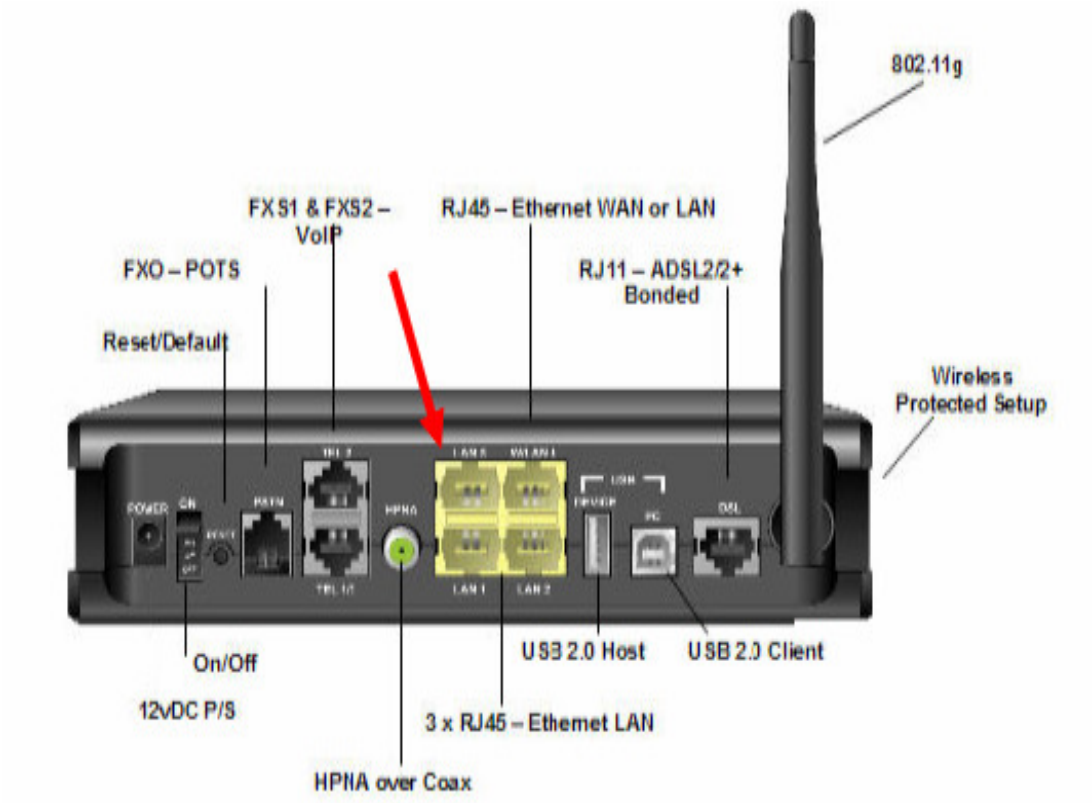
12	Prior to connecting the Ethernet cord, ensure the Cisco DDR2200 Gateway is in sync and both the DSL and Internet LEDs on the front panel of the gateway are solid.
13	Connect one end of an Ethernet cord to a LAN port on the back of the Cisco DDR2200 Gateway. 
14	Connect the other end of the Ethernet cord to the Ethernet Jack on the top of the test set.
15	Press OK and allow the script to run. It will perform a Ping & FTP test.

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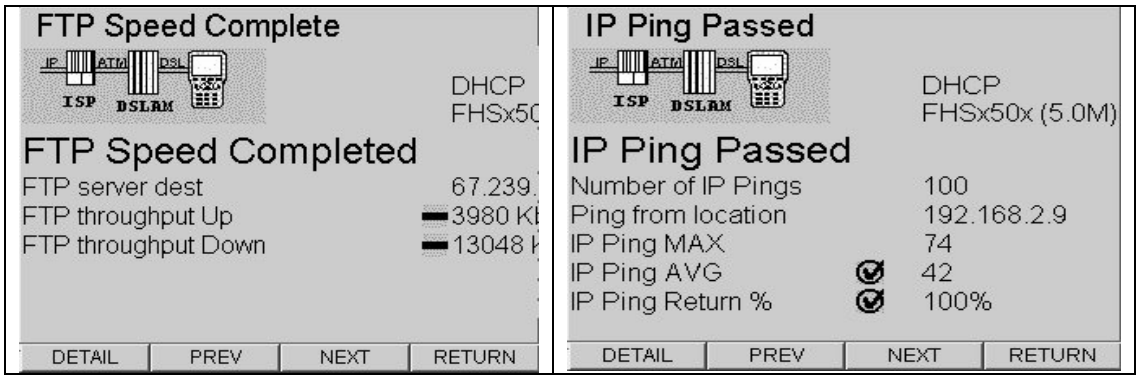
16	Summary Screens will appear recapping which portions of the Ping/FTP test passed or failed.  **Click OK**
17	Perform normal test close-out procedures and upload test results to the D.A.T.A.✓ Server.

Accessing and Reviewing ADSL2+ BONDED HSI Test Results:

Once testing is complete and properly closed-out, test results are immediately loaded to the D.A.T.A.✓ Server. Results can be viewed via the D.A.T.A.✓ server by clicking on "Job Summary Report" and entering the appropriate search criteria.

- Link to D.A.T.A.✓ Server: https://datacheck.jdsu.com/embarq

The illustration below provides an example of the ADSL2+ Bonded HSI test results provided via the D.A.T.A.✓ server. Key aspects of these test results have been noted on this example.

Job Detail Report

PDF Export	Click Here
Job Number	N798695
Phone Number	7026441338
Model	HST-3000c
Vice President	Dana Chase
Director	Scott Mitchell
Area Operation Manager	THOMPSON, STEVEN
Area Plant Supervisor	HARRISON, J.
Tech ID	92527
Inst Job Date/Time	04-09-10 13:03:43
Server Upload	04-09-10 12:59:07 EST
Job Pass	True

Job Type	Bonded ADSL
Help Dialogs	On
Profile Order	Cust Service Tech
Job Location	Jack
HST ID	D46F53000000

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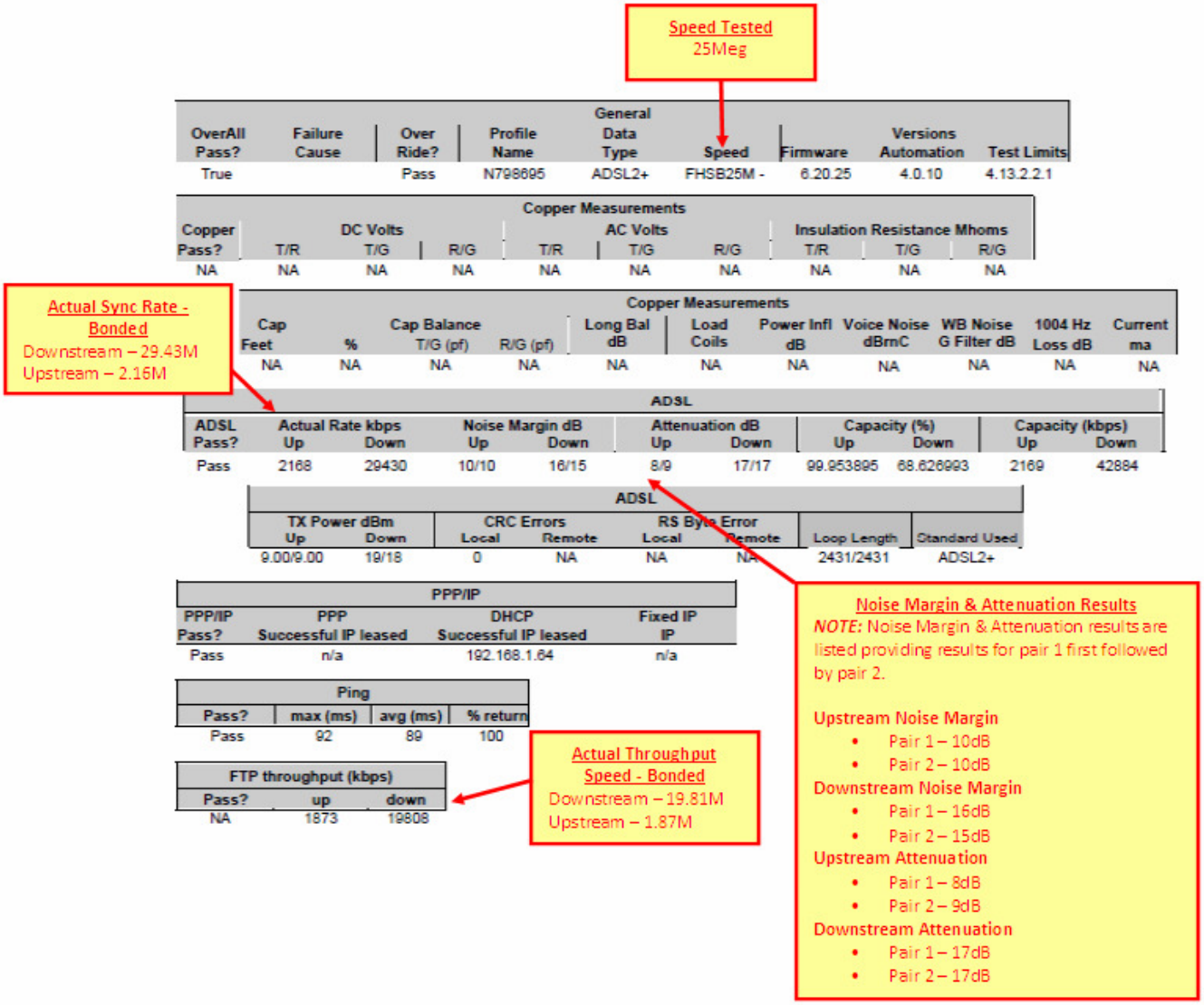
Speed Tested
25Meg
General
OverAll Pass? | Failure Cause | Over Ride? | Profile Name | Data Type | Speed | Firmware | Versions Automation | Test Limits
True | Pass | N798695 | ADSL2+ | FHSB25M - | 6.20.25 | 4.0.10 | 4.13.2.2.1
Copper Measurements
Copper Pass? | DC Volts T/R | T/G | R/G | AC Volts T/R | T/G | R/G | Insulation Resistance Mhoms T/R | T/G | R/G
NA | NA | NA | NA | NA | NA | NA | NA | NA | NA
Actual Sync Rate - Bonded
Downstream – 29.43M
Upstream – 2.16M
Copper Measurements
Cap Feet | Cap Balance % | T/G (pf) | R/G (pf) | Long Bal dB | Load Coils | Power Infl dB | Voice Noise dBrnC | WB Noise G Filter dB | 1004 Hz Loss dB | Current ma
NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA
ADSL
ADSL Pass? | Actual Rate kbps Up | Down | Noise Margin dB Up | Down | Attenuation dB Up | Down | Capacity (%) Up | Down | Capacity (kbps) Up | Down
Pass | 2168 | 29430 | 10/10 | 16/15 | 8/9 | 17/17 | 99.953895 | 68.626993 | 2169 | 42884
ADSL
TX Power dBm Up | Down | CRC Errors Local | Remote | RS Byte Error Local | Remote | Loop Length | Standard Used
9.00/9.00 | 19/18 | 0 | NA | NA | NA | 2431/2431 | ADSL2+
PPP/IP
PPP/IP Pass? | PPP Successful IP leased | DHCP Successful IP leased | Fixed IP IP
Pass | n/a | 192.168.1.64 | n/a
Ping
Pass? | max (ms) | avg (ms) | % return
Pass | 92 | 89 | 100
FTP throughput (kbps)
Pass? | up | down
NA | 1873 | 19808
Actual Throughput Speed - Bonded
Downstream – 19.81M
Upstream – 1.87M
Noise Margin & Attenuation Results
NOTE: Noise Margin & Attenuation results are listed providing results for pair 1 first followed by pair 2.
Upstream Noise Margin
• Pair 1 – 10dB
• Pair 2 – 10dB
Downstream Noise Margin
• Pair 1 – 16dB
• Pair 2 – 15dB
Upstream Attenuation
• Pair 1 – 8dB
• Pair 2 – 9dB
Downstream Attenuation
• Pair 1 – 17dB
• Pair 2 – 17dB

11.0 Qualify and Install Wiring for Gateway Installation

11.1 *Install Wiring for Gateway:*

Step	Action
1	At NID locate and install DSL lines (two lines per customer)
2	Wire dial tone pair to home phone wiring POTS Splitter.
3	Run CAT5 cable from phone NID to data jack for the gateway. Wire pins 3&4 (line 1 inner pair) and 2&5 (line 2 outer pair) to the data port with RJ11

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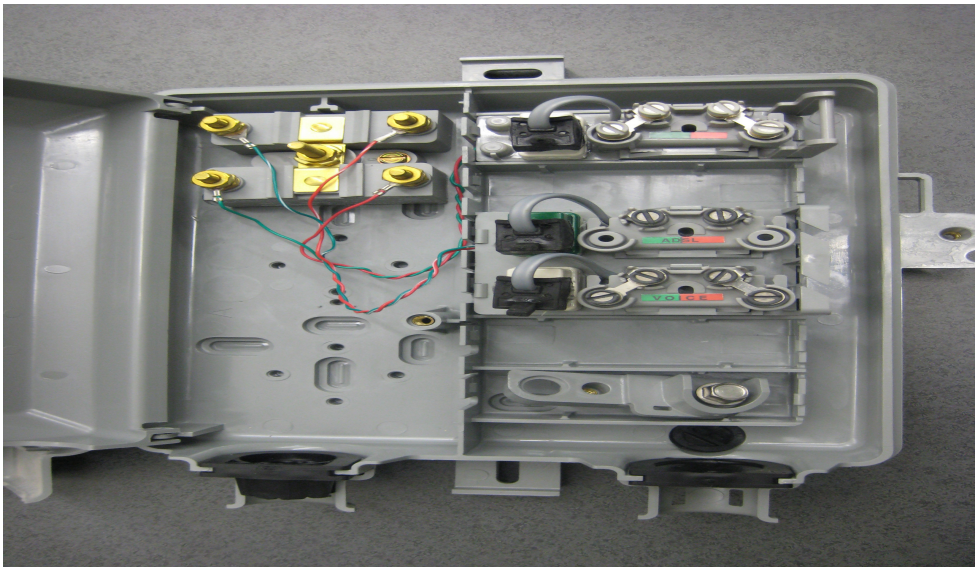
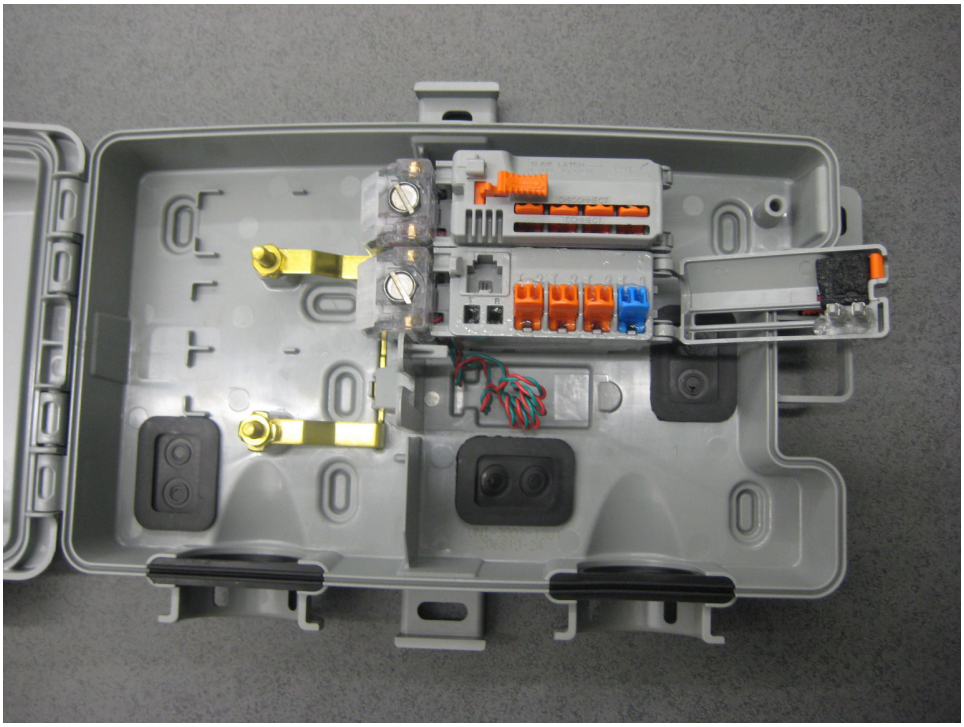
	connector for the gateway.

11.2 *Legacy NID Wiring Example – Splitter must be installed on pair carrying POTS service*



11.3 *UNID Wiring Example – Splitter must be installed on pair carrying POTS service*



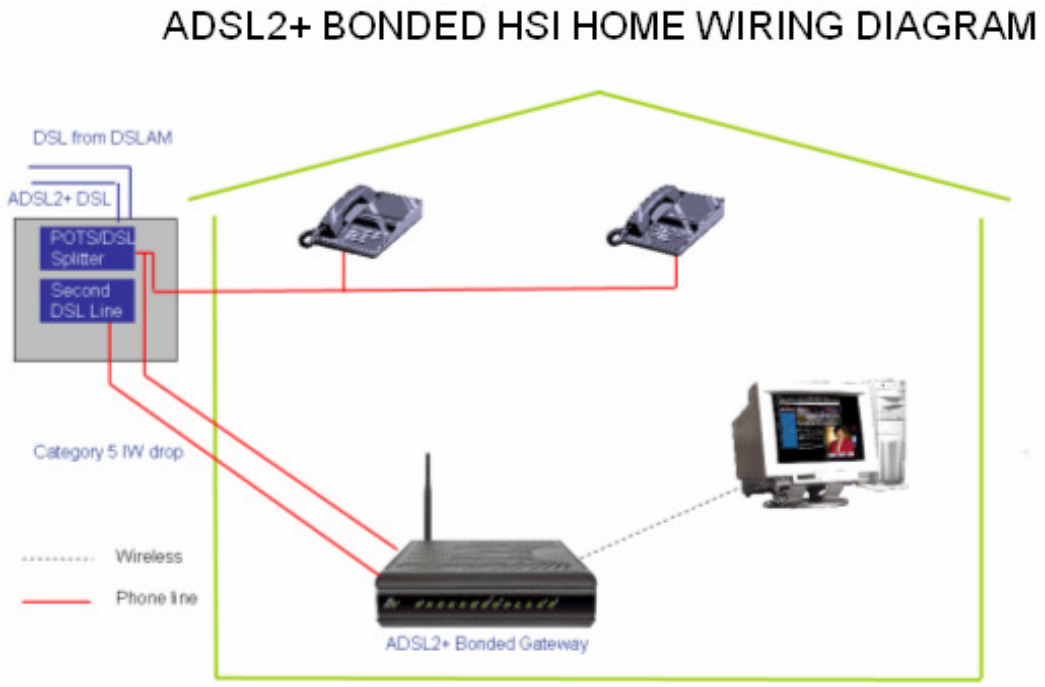
12.0 ADSL2+ Bonded and CPE installation instructions

12.1 *ADSL2+ Bonded Technology*

Bonded ADSL2+, defined through the International Telecommunication Union's ITU-T G.998.1 standard, combines two or more copper pairs as a single connection.

The technology allows the delivery of up to 48 Mbps of downstream throughput speed over a bonded ADSL2+ connection. Bonding functionality is delivered via a software based solution rather than a physical bonding of the DSL pairs. The DSLAM and the modem/gateway create the virtual bond allowing for to DSL lines to work as one. The ADSL2+ bonded pair is sent through a Category 5 home run to a data jack near the gateway.

12.2 *Premise Diagram*



12.3 *Equipment*

The Cisco DDR2200 Residential Gateway supports Triple Play architectures and doubles the bandwidth performance of traditional ADSL2+ modems owing to its support of DSL bonding. The device has four 10/100 Ethernet ports, 802.11g wireless LAN, dual ADSL line ports and USB interfaces including host function for peripheral devices.

As a fully functional residential gateway, the Cisco DDR2200 has full routing capabilities including traffic management and TR-069 capability

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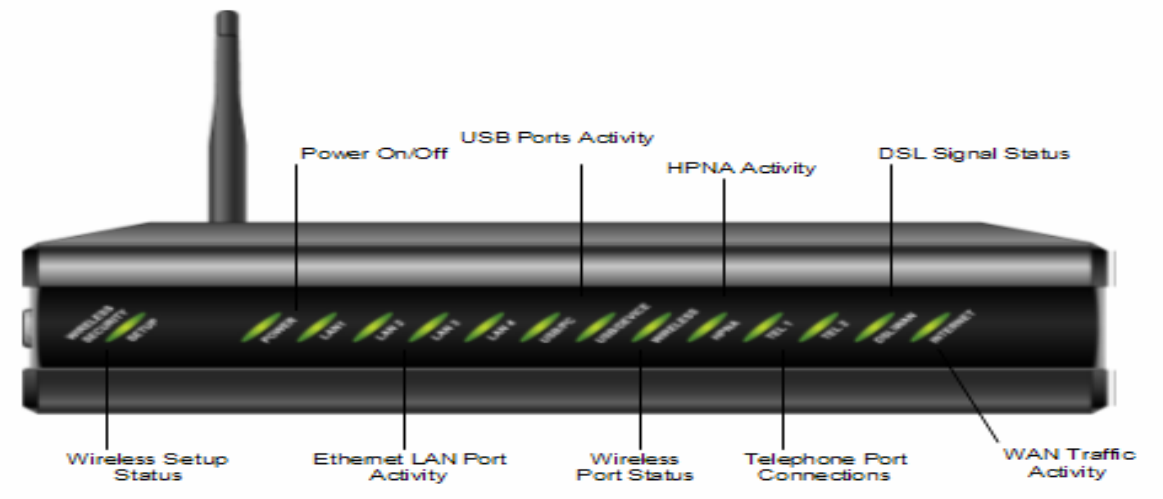
12.4 *DDR2200 Front Panel*



LED Explanation	
Wireless Security Setup	Allows to automatic configuration the wireless device in the home. The WIRELESS SECURITY SETUP LED shows whether automatic wireless security is on or off.
POWER On/OFF	Illuminates solid green to indicate that AC power is being applied to the residential gateway.
Ethernet LAN port activity (1-4)	Illuminates solid green to indicate that an Ethernet carrier is present and blinks to indicate that Ethernet data is being transferred between the PC and the residential gateway.
USB/PC	Illuminates solid green to indicate that a USB carrier is present and blinks to indicate that USB data is being transferred between the PC and the residential gateway
USB/DEVICE	Illuminates solid green to indicate that a USB carrier is present and blinks to indicate that USB data is being transferred between the connected USB device and the residential gateway
WIRELESS	Illuminates solid green when the wireless access point is enabled and operational and blinks to indicate that wireless data is being transferred between the PC and the residential gateway. The LED is off when the wireless access point is disabled by the user
HPNA	Illuminates solid when linked to another HPNA device (set top box) and blinks when HPNA activity occurs
TEL 1 and TEL 2	TEL 1 illuminates solid green when telephony service is enabled. Blinks when line 1 is in use. TEL2 illuminates solid green when telephony service is enabled. Blinks when line 2 is in use
DSL/WAN	Indicates whether a DSL signal is acquired (or trained). The LED indicators mean the following status: • Off. Not trained. Both pairs are down or disconnected

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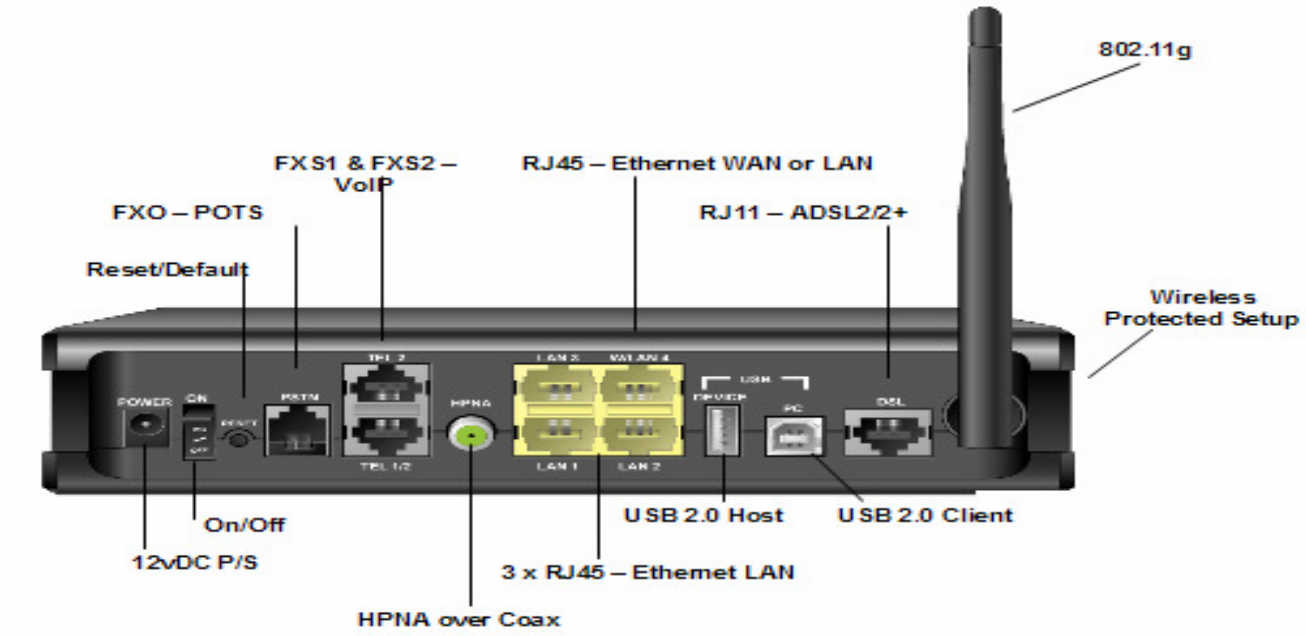
	• Blinking. In training. ○ If the inner pair is **up** and the outer pair is **down**, the DSL LED will blink slowly. The blinking will occur about once every 750 milliseconds — almost one blink every second — count to a one, one thousand beat ○ If the inner pair is **down** and the outer pair is **up**, the DSL LED will blink faster. The blinking will occur about once every 250 milliseconds — almost four blinks every second. ○ Solid. Trained.
INTERNET	Indicates wide area network (WAN) traffic. The LED indicators mean the following status: • Solid - IP is connected. • Blinking - WAN interface has activity. Off - No Internet connection. (not pulling an IP)

12.5 *DDR2200 Rear Panel*



Rear Panel Explanation	
POWER	Connects the residential gateway to the AC power plug that is provided with your residential gateway
On and Off Switch	Powers the residential gateway on and off
RESET	Activating this switch resets the residential gateway. Pressing this switch for more than 10 seconds resets the device to factory default values and resets the residential gateway
PSTN	Connects to the home telephone wiring and is used as a backup to voice over IP (VoIP) service in the event of a power outage to the residential gateway
TEL 1 and TEL 2	RJ-11 telephone ports connect to home telephone wiring to conventional

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	telephones or fax machines
HPNA	Connects to the coaxial cable wiring in the house for data and video distribution
LAN 1-LAN 3 W/LAN 4	Four RJ-45 Ethernet ports connect as follows: • LAN 1 through 3 connect to the Ethernet port on your PC or your home network • W/LAN 4 connects to the Ethernet port on your PC if used as a LAN port or optionally as an Ethernet wide area network (WAN) port that connects to the service provider network
USB DEVICE	12 Mbps USB port connects to the USB port on your device such as a flash drive or digital camera
USB PC	12 Mbps USB port connects to the USB port on your PC
DSL	RJ-11 port connects to the DSL line from the service provider
ANTENNA	Receives and transmits data packets to wireless devices
Important! The USB ports on the gateway should not be used!	

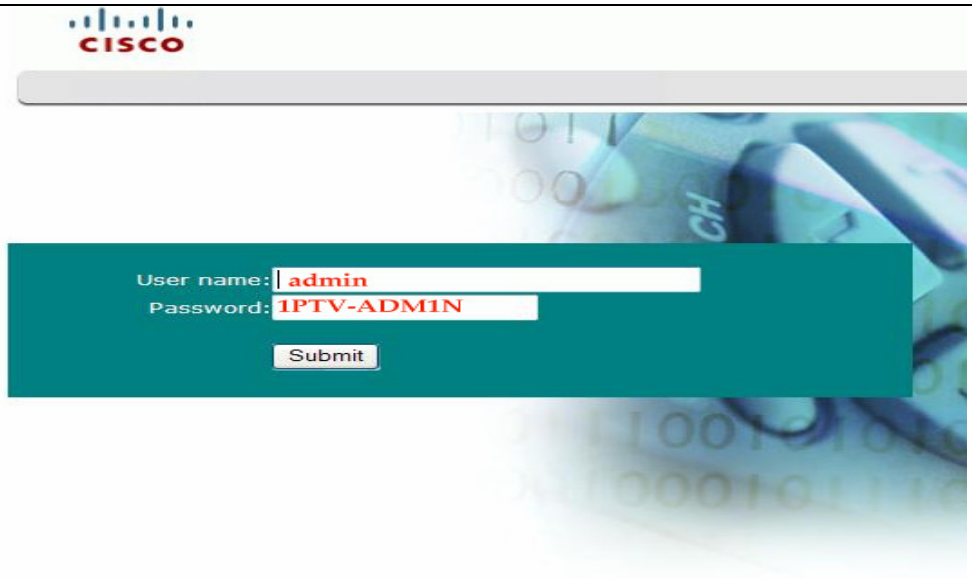
12.6 *Install Gateway*

Connect power to gateway. Power gateway on and wait for sync. The LEDs labeled Power and DSL WAN will light up and stay solid.

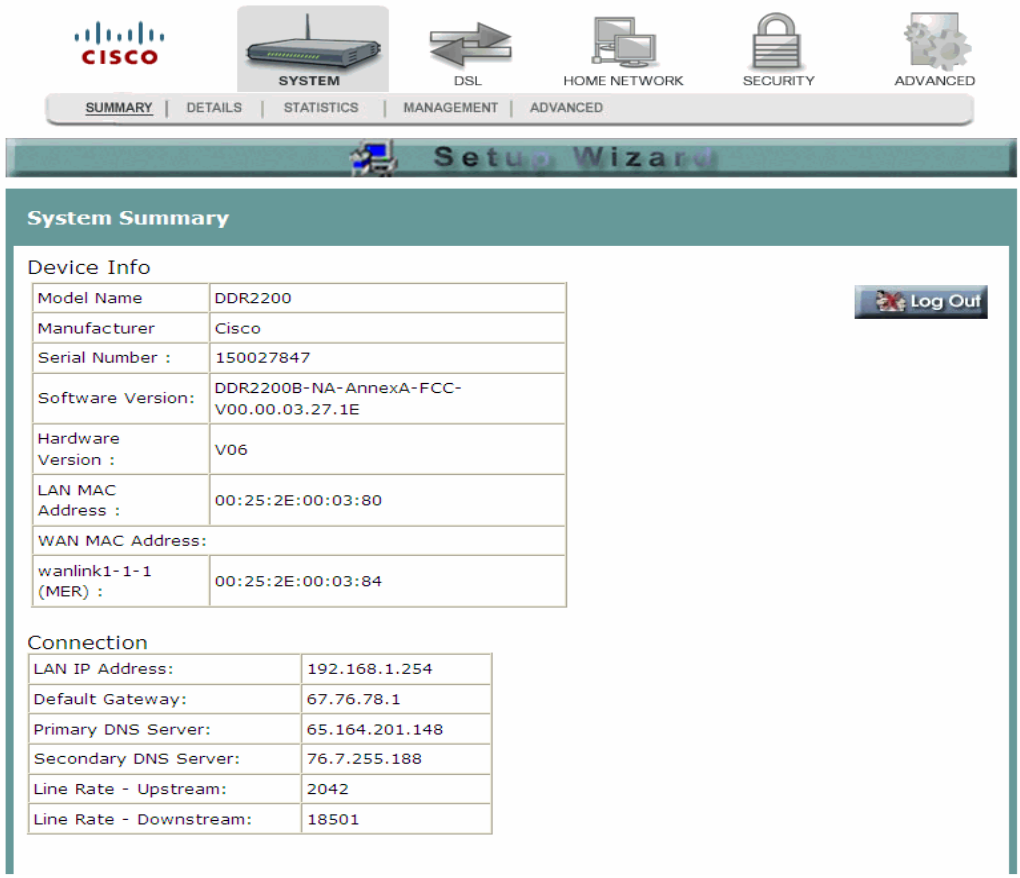
12.7 *DDR2200 Configuration*

The CISCO DDR2200 is configured by default to support DHCP and bonded ADSL2+. The unit as configured should come out of box with the required configuration to complete the customer premise installation.

Device Access information	Open web browser and enter **192.168.1.254** into the address bar. The DDR2200 has three tiers of access. **Username: admin** **Password: 1PTV-ADM1N** Username: support Password: 1PTV-SUPPORT Username: user Password: User



System Summary



When logged in the **System Summary** screen will display

DHCP WAN

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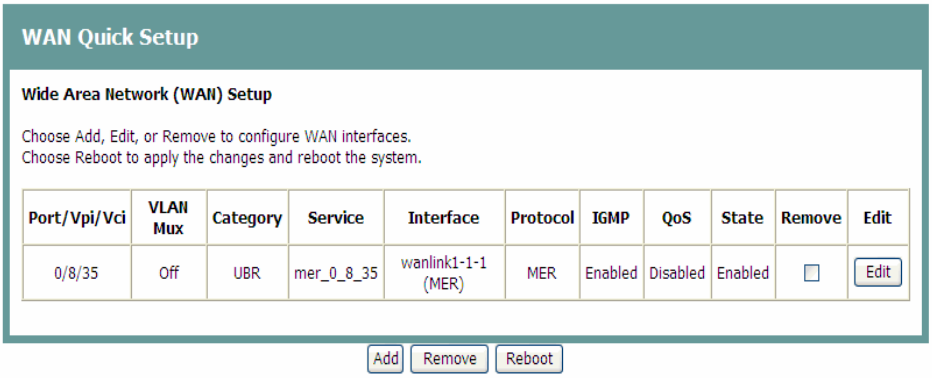
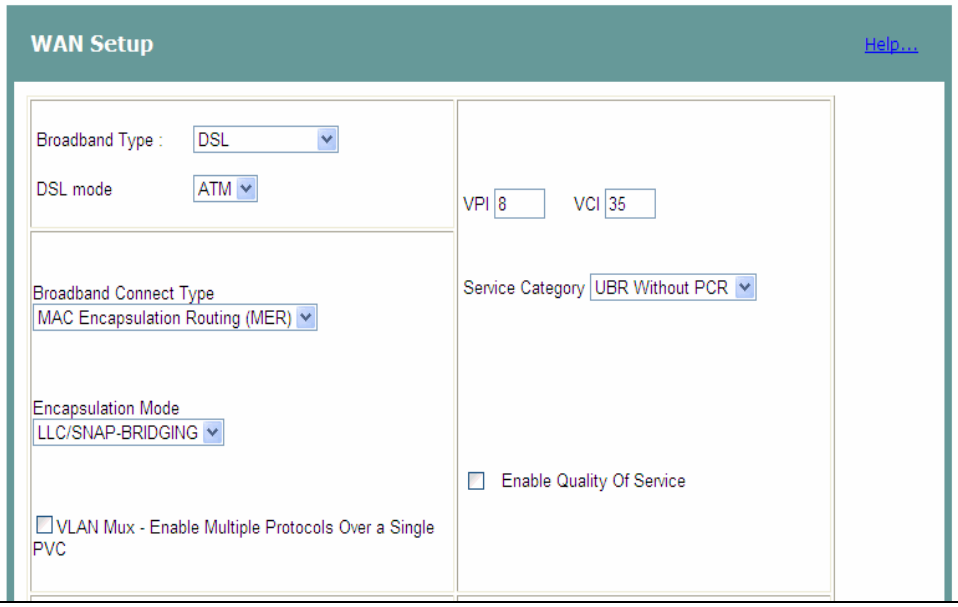
Setup



Click **HOME NETWORK, WAN SETUP**, and then click the **Edit** button on the right side of the screen.



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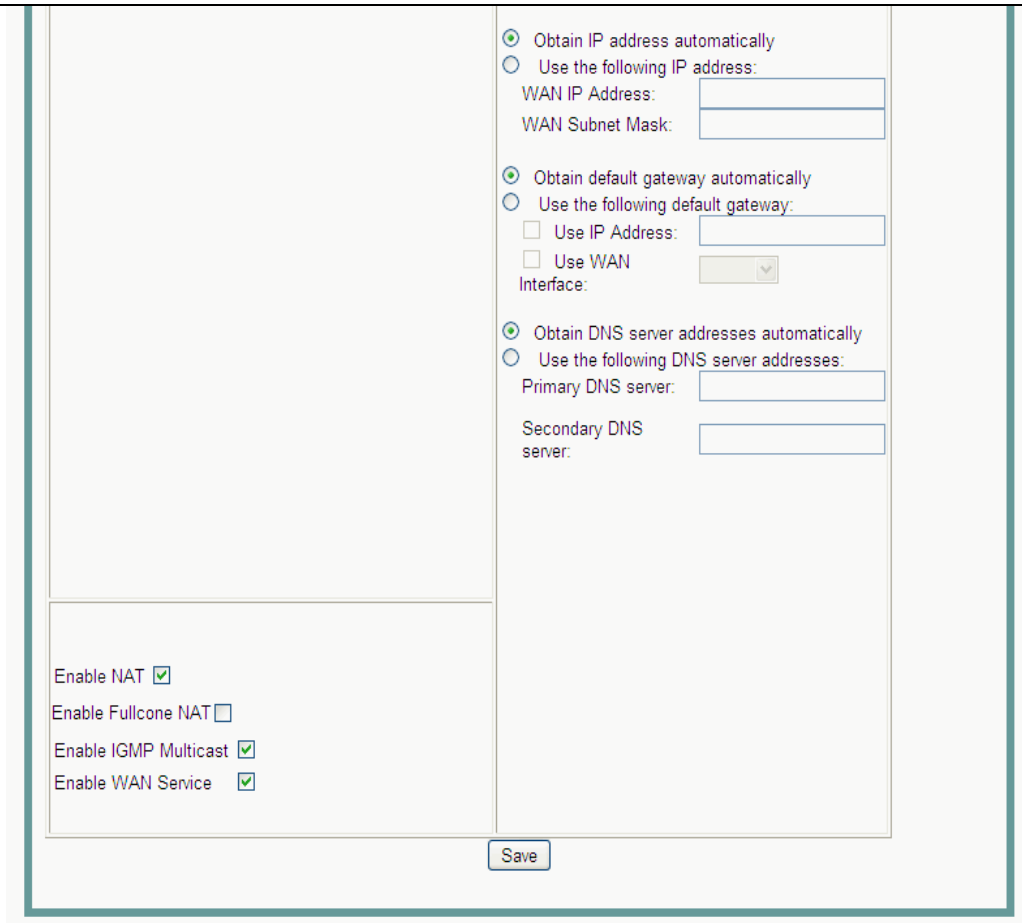
DHCP WAN continued



Apply the following settings:

- **Broadband Type**: DSL
- **DSL mode**: ATM
- **Broadband Connect Type**: MAC Encapsulation Routing (MER) (DHCP)
- **Encapsulation Mode**: LLC/SNAP-Bridging
- **VPI**: 8
- **VCI**: 35
- **Service Category**: UBR Without PCR
- **Enabled NAT**
- **Enabled IGMP Multicast**
- **Enable WAN Service**

Click **Save**

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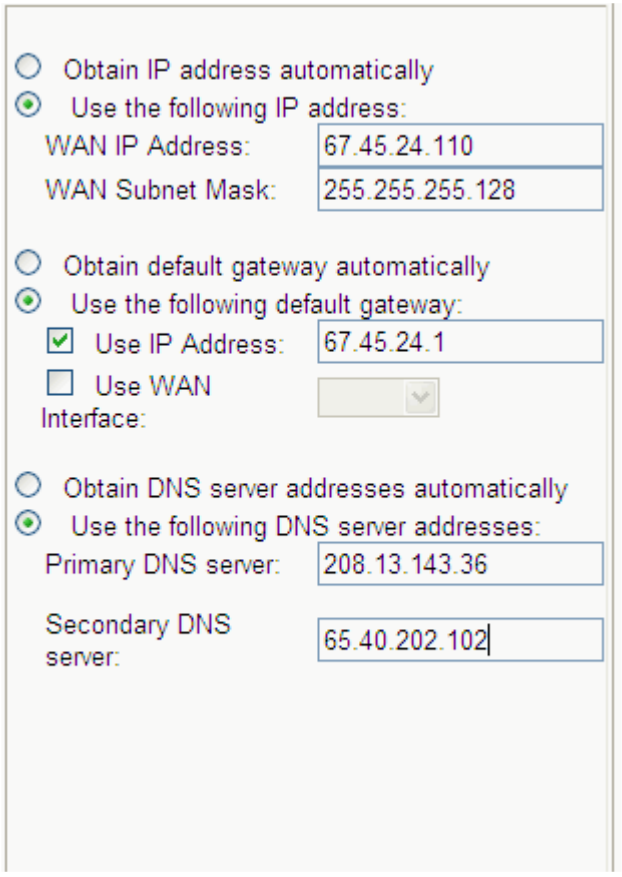
WAN Static IP config	 Check **Use the following IP address, default gateway and DNS server address** fields and input assigned Static IP, Gateway, Subnet mask and appropriate DNS server information for your area.

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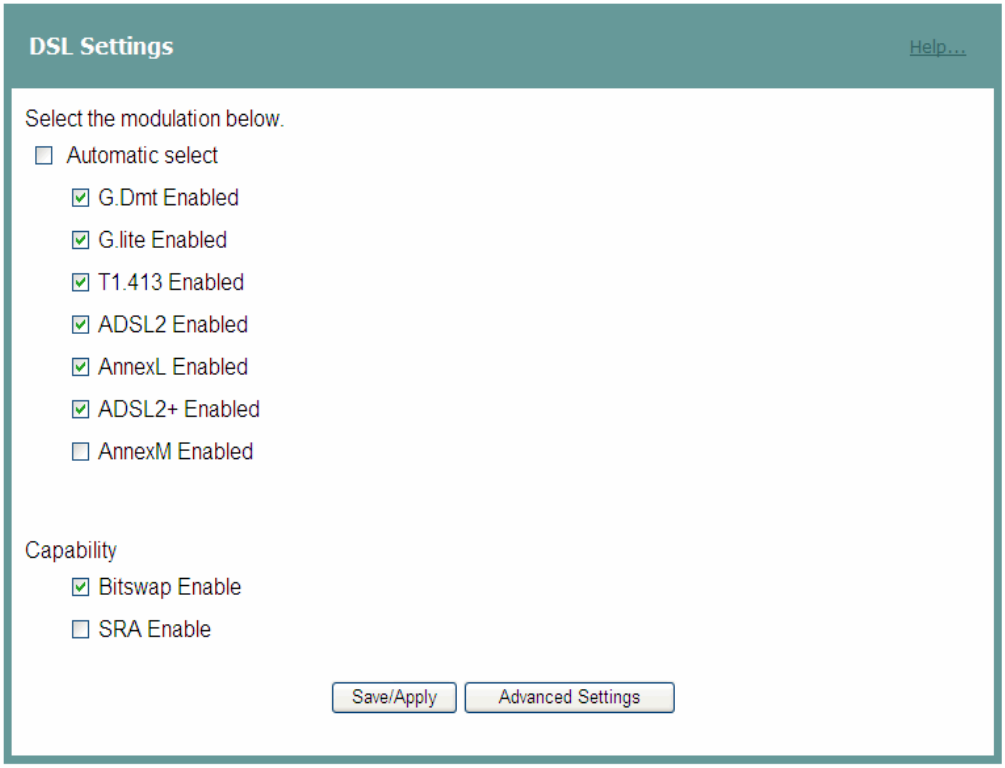
DSL LINE Config



Click **DSL,** and then click **Setting**

- Everything should be selected under **modulation** except **Automatic Select** and **AnnexM Enabled**
- **Bitswap Enabled** under **Capability** should be selected

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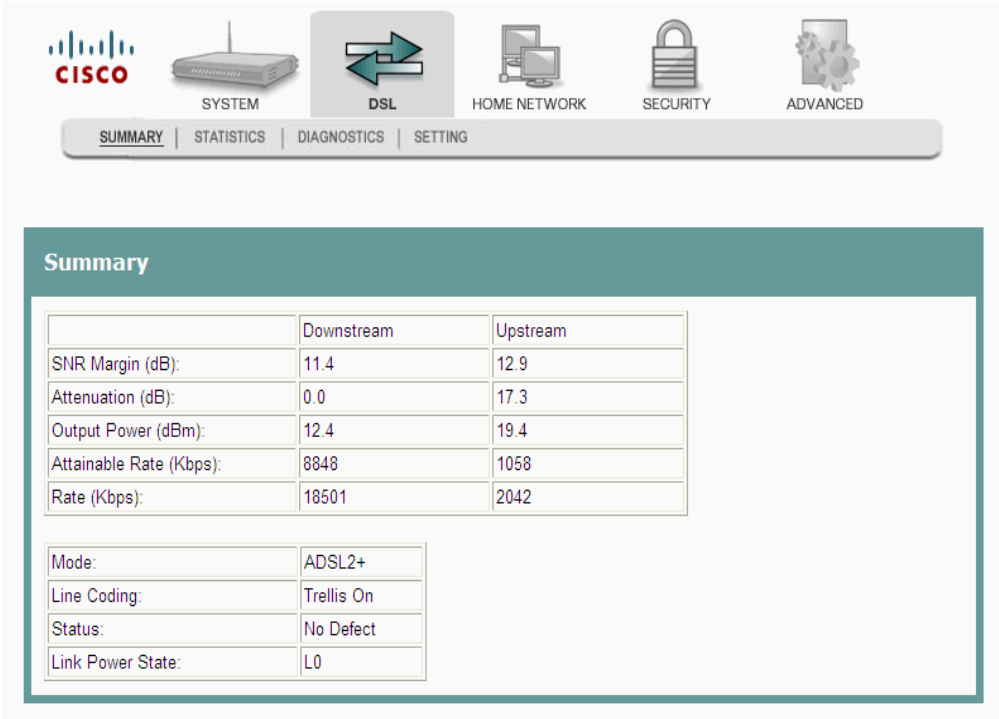
View DSL Line Stats



Click **DSL** and **Summary**.

- **SNR Margin (dB)** - noise margin
- **Attenuation (dB)** - attenuation
- **Attainable Rate (Kbps)** - Line 1 train rate
- **Rate (Kbps)** – current bonded train rate

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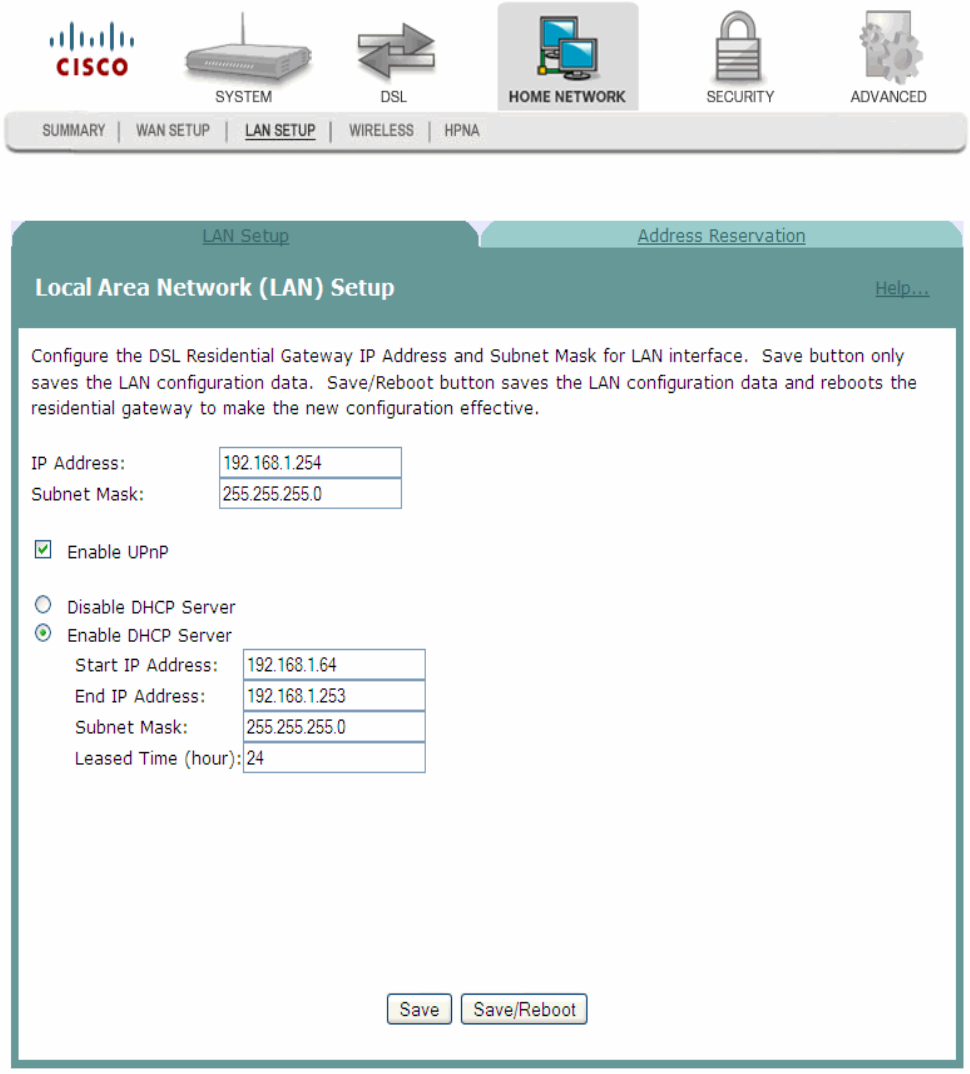
LAN setup


CISCO
SYSTEM
DSL
HOME NETWORK
SECURITY
ADVANCED
SUMMARY | WAN SETUP | LAN SETUP | WIRELESS | HPNA
LAN Setup
Address Reservation
Local Area Network (LAN) Setup
Help...
Configure the DSL Residential Gateway IP Address and Subnet Mask for LAN interface. Save button only saves the LAN configuration data. Save/Reboot button saves the LAN configuration data and reboots the residential gateway to make the new configuration effective.
IP Address: 192.168.1.254
Subnet Mask: 255.255.255.0
Enable UPnP
Disable DHCP Server
Enable DHCP Server
Start IP Address: 192.168.1.64
End IP Address: 192.168.1.253
Subnet Mask: 255.255.255.0
Leased Time (hour): 24
Save
Save/Reboot

Click **HOME NETWORK**, and then click **LAN Setup**.
Apply the following settings:

- **IP Address**: 192.168.1.254
- **Subnet Mask**: 255.255.255.0
- **Enable DHCP Server**: Check to enable (default)

Click **Save** (only saves the LAN configuration changes) or click **Save/Reboot**: saves the LAN configuration data and reboots the Cisco to immediately implement the changes.

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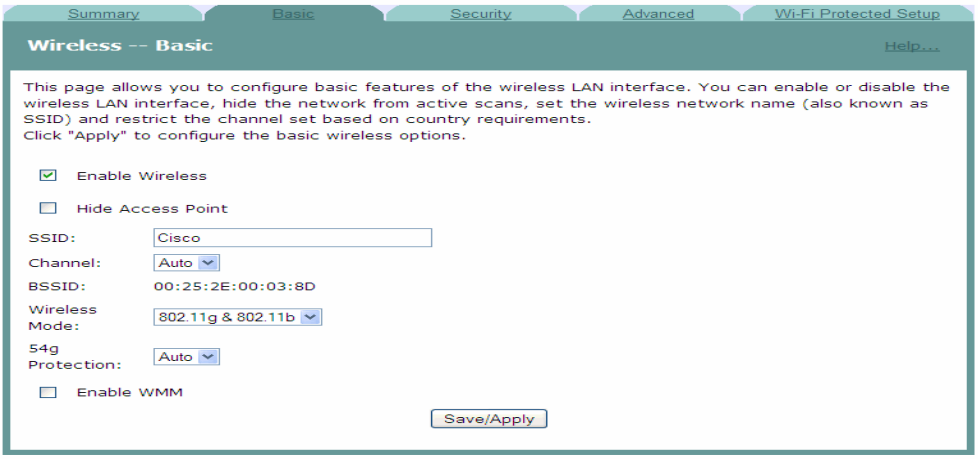
Wireless Configuration

Click **HOME NETWORK** and then click on **Wireless.** The **Summary** tab will display be default.

Apply the following settings:

- **SSID**: **Cisco_xxxx** (or customer requested)
  - Note: Default SSID is Cisco_xxxx where xxxx is the last 4 digits of the gateway's serial number.
- **Authentication**: open
- **Encryption**: WEP Encryption: enabled (default)

Click on the **Basic** tab to display wireless settings.


Summary
Basic
Security
Advanced
Wi-Fi Protected Setup
Wireless -- Basic
Help...
This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.
Click "Apply" to configure the basic wireless options.
Enable Wireless
Hide Access Point
SSID: Cisco
Channel: Auto
BSSID: 00:25:2E:00:03:8D
Wireless Mode: 802.11g & 802.11b
54g Protection: Auto
Enable WMM
Save/Apply

Enable wireless: Enabled by default.
Hide access Point: disables SSID broadcast, not enabled by default.
SSID: **Cisco_xxxx** by default.
Channel: should be set to **Any**
Wireless Mode: 802.11g & 802.11b by default
54g Protection: auto by default

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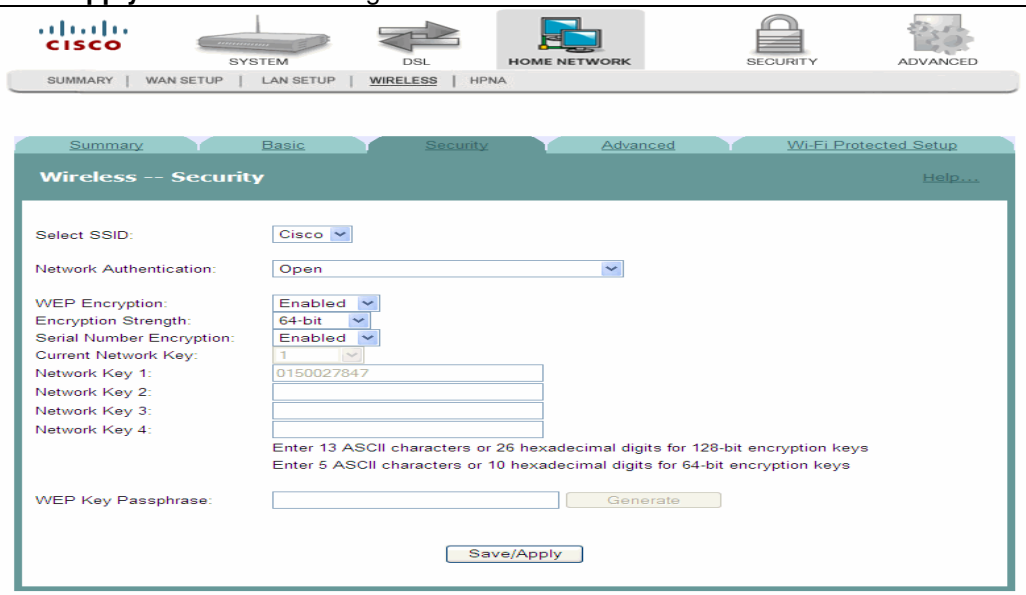
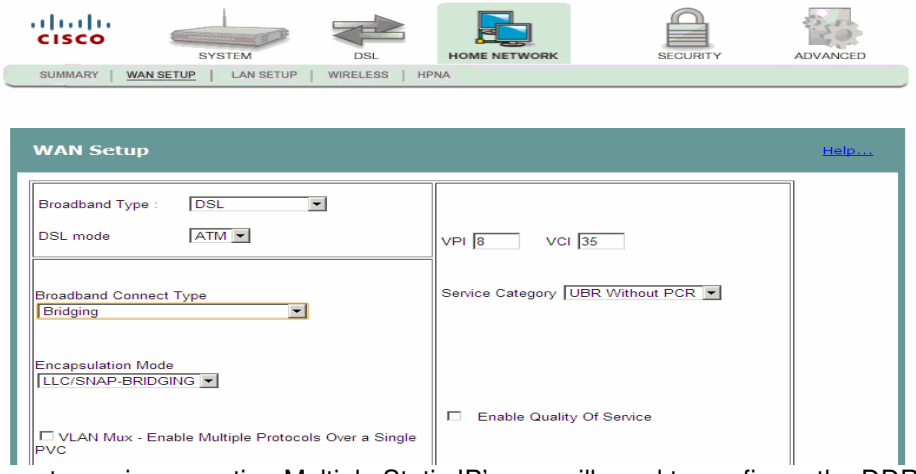
	Enable WMM: not selected **Save/Apply**: click to save changes
Wireless Configuration continued	 Click on **Security** tab to get to wireless security setup. ▪ **Select** SSID: Cisco_xxxx (or name created on previous section) ▪ **Network Authentication**: Open ▪ **WEP Encryption**: Enabled ▪ **Encryption Strength**: 64-bit (XP requires SP3) ▪ **Current Network Key**: 1 ▪ **Network Key 1**: WEP key **Note**: **WEP Key** is the serial number with a zero at the beginning. **Example**: Serial number: 150007561 = WEP Key: 0150007561
Bridge Mode	 If a customer is requesting Multiple Static IP's you will need to configure the DDR2200 in Bridge Mode. ▪ Click on **Home Network** ▪ Select **WAN Setup** ▪ Under Broadband Connect Type select **Bridging**

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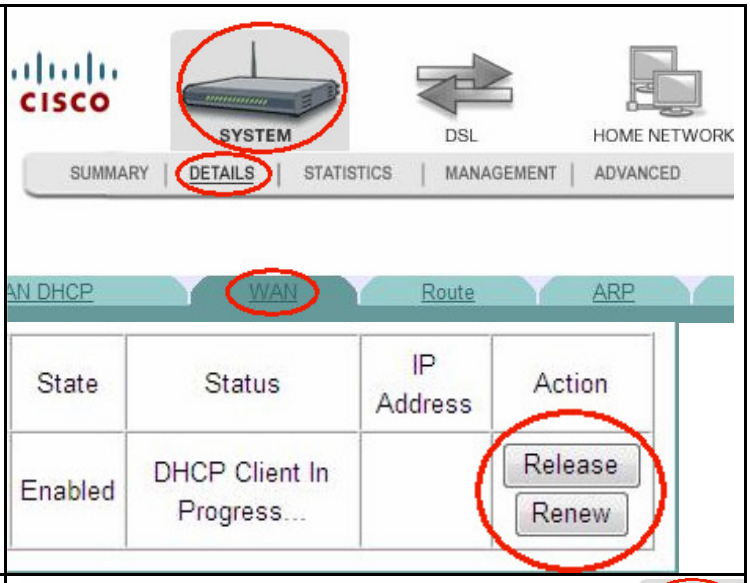
13.0 Troubleshooting

Release/Renew WAN IP

From **System** menu click on **Details**.

Select the **WAN** tab.

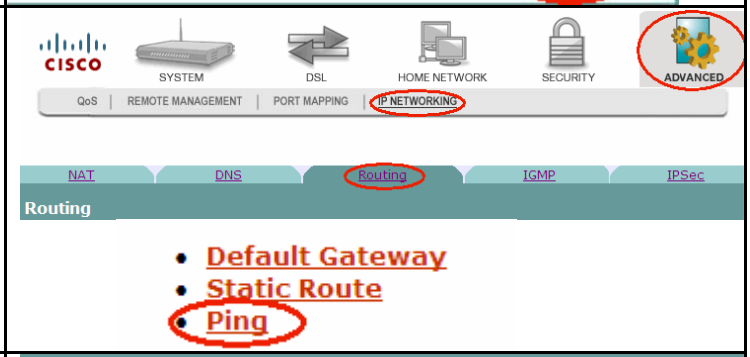
Release: releases the IP lease form the SAM
Renew: requests a new IP lease from the SAM



Ping Test

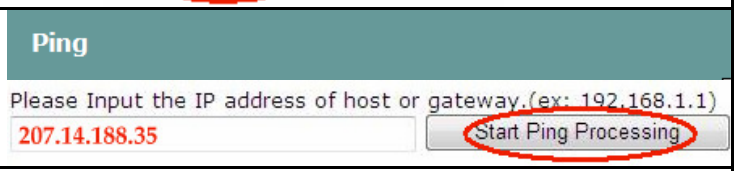
From **Advanced** on the **IP Networking** menu select the **Routing** tab.

Click **Ping**.



The **Ping** screen will display.

Enter an **IP** and then click **Start Ping Processing**.



Viewing Single Line Stats

To View Single Line Sync Rates, log into the DDR2200 via the following IP address

- http://192.168.1.10/bondinginfo.xml

After entering the above IP address, the Gateway will display coding illustrating sync rate data and Mac address information. The example below illustrates the information returned when using the above IP address, and notes where to locate both Bonded and Single Line Sync Rate statistics.

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE bondinginfo (View Source for full doctype...)>
<bondinginfo>
  <bonding_bypass>disabled</bonding_bypass>
  <bonding_group_id>1024</bonding_group_id>
  <adsl_aggr_rate_us>1720</adsl_aggr_rate_us>
  <adsl_aggr_rate_ds>17479</adsl_aggr_rate_ds>
  <aal5_tot_rx_count>1632001</aal5_tot_rx_count>
  <aal5_tot_tx_count>876709</aal5_tot_tx_count>
  <atm_tot_rx_count>49733608</atm_tot_rx_count>
  <atm_tot_tx_count>2300950</atm_tot_tx_count>
- <bonding_errors>
    <wrong_vpi_vci_count>1</wrong_vpi_vci_count>
    <out_of_order_sid_count>0</out_of_order_sid_count>
    <reordering_queue_flush_count>0</reordering_queue_flush_count>
    <out_of_range_sid_count>0</out_of_range_sid_count>
    <missing_cells_count>2055</missing_cells_count>
  </bonding_errors>
- <vpi_vci_entry>
    <vpi_vci>8/35</vpi_vci>
    <vpi_vci_priority>0</vpi_vci_priority>
    <aal5_vc_rx_count>1632001</aal5_vc_rx_count>
    <aal5_vc_tx_count>876709</aal5_vc_tx_count>
    <atm_vc_rx_count>49733606</atm_vc_rx_count>
    <atm_vc_tx_count>2080280</atm_vc_tx_count>
    <wrong_len_count>24</wrong_len_count>
    <wrong_crc_count>9</wrong_crc_count>
  </vpi_vci_entry>
- <vpi_vci_entry>
    <vpi_vci>0/36</vpi_vci>
    <vpi_vci_priority>0</vpi_vci_priority>
    <aal5_vc_rx_count>0</aal5_vc_rx_count>
    <aal5_vc_tx_count>0</aal5_vc_tx_count>
    <atm_vc_rx_count>0</atm_vc_rx_count>
    <atm_vc_tx_count>0</atm_vc_tx_count>
    <wrong_len_count>0</wrong_len_count>
    <wrong_crc_count>0</wrong_crc_count>
  </vpi_vci_entry>
- <slave>
```

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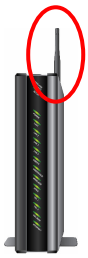
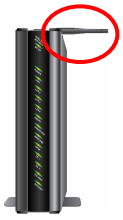
Helpful Troubleshooting Tips

If the customer is experiencing slow speeds when connected wirelessly to the DDR2200 gateway, or if they are having trouble picking up or maintaining the wireless signal, here are a few things to check:

- Is the customer's network card/adapter 802.11B, G or N? (Note: The DDR2200 is 802.11b/g)
  - With 802.11b, the customer will only get throughput speeds up to 11Mbps (average actual throughput = 3 - 5Mbps)
  - With 802.11g, the customer gets up to 54Mbps of bandwidth (average actual throughput = 15 - 25Mbps)
  - Try changing the DDR2200 wireless setting to 802.11g if the customer's network card/adapter supports 802.11g.
- If using Internet Explorer, try an alternate browser (i.e. Firefox).
- The computer's wireless card may need updated drivers.
- Change encryption from WEP to WPA.
- Change the gateway's wireless channel to see if signal strength improves.
- If the customer has a single story home, the gateway should be vertical and the antenna should be vertical:



- If the customer has a two-story home and the gateway will be on a different floor than the computer, it should be vertical and the antenna should be horizontal:



Note: These are recommendations to deal with trouble coverage situations. If there isn't a problem with wireless coverage the gateway can be installed in whatever configuration works best.

- Is there something in the customer's home or in the structure of the building that could be interfering with the signal, such as metal, multiple walls, wireless interference (microwave, wireless phones, baby monitors, blue tooth devices)?
  - For more information on placement of the gateway for maximum performance, refer to the *Gateway Placement Information* document in the Appendix.

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14.0 Speed Test procedure

Conduct FTP Speed Test	**From the gateway conduct FTP speed test to local CENTURYLINK FTP server.** 1. Click **Start** or the **Start icon**. 2. Click **Run** or search for **cmd** to access the **Command Prompt**. 3. Type **ftp xx.xx.xx.xx** (local FTP server address from list below) and press **Enter**. 4. Type **ftp** as the user name, press **Enter**. 5. No password is required, press **Enter**. 6. Type **hash** and press **Enter**. For Download Tests; 1. Type **get test.2meg** and press **Enter**. 2. Record readings. DSL line speed is measured in bits per second (64KB is the same as 512kbps). There are 8 bits to a byte, so multiply the total byte rate by 8 to get the bit rate. For Upload Tests; 1. Type **cd upload** and press **Enter**. 2. Type **put test.2meg** and press **Enter**. (NOTE: The upload test must use the same file used in the download test. 3. Record readings. (See step 2 in Download Tests.) 4. Type **bye** and press **Enter** to end the session. **FTP Servers:** FL - 209.26.88.30 FL (South)-67.239.66.98 IN - 67.235.59.22 KS - 76.7.255.187 MN - 65.41.112.27 MO - 65.164.201.146 NC - 63.162.197.68 NE – 76.7.255.187 NJ - 207.14.188.35 NV - 208.13.143.37 OH - 205.244.194.35 OR - 65.40.220.20 PA - 74.5.119.66 SC - 63.162.197.68 TN - 76.5.159.134 TX - 65.40.202.101 TX (HMBL)- 67.76.234.227 WA - 65.40.220.20 WY - 65.164.201.146 VA - 208.33.159.36

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15.0 SERVICE ORDER & TROUBLE TICKET EXAMPLES

15.1 SERVICE ORDER EXAMPLE:

Below is an ADSL2+ Bonded HSI Service Order Example. This example illustrates all sections of an order; Due Date, Remarks, S&E Codes and Assignments. Key aspects specific to an ADSL2+ Bonded HSI Service Order have been noted.

```
Co:                24
State:             NV
Exch:              LVGS
Order No:          C726990
Process Timestamp: 2009-10-29 13:05:56.144

     C726990/SUP06   LVGS   COMPLETED                        SO271A01/030
         95.40       B    702 614-0333       460      E0I     00  CEKUDS1 N2401
                 10-23-09              10-29-09       10-29-09

    - LIST
      LN    THE; COMPANY
      LA    111 HAPPY RD/COM HENDERSON/LZIP 89015-7230
            /EXCH LVGS/COM HENDERSON/ZIP 89015-7230
    - BILL
      COAM  V
      TAR   0004
      COS   21
    - RMKS
      RMK2  CCIAS KED OT UPGRADE HSI DSL TO 15MG
*     RMK1  \BONDED
*     RMK1  \FULL INSTALL
*     RMK1  \INSTALL SPLITTER
*     RMK0 ARC TIMESTAMP 10-23-2009 17.54.05 U 00
*     RMK1  10-26-09 ASSGND & RLSD UUV1236 800-452-0535
*     RMK1  26 GAUGE - 2809
*     RMK1  24 GAUGE - 1890
*     RMK1  22 GAUGE - 100
*     RMK1  BRIDGE TAP REMOVAL REQUEST SENT TO ENG R.KIES
*     RMK0  **ATTN TECH** DO NOT PRE-WIRE**
*     RMK0  **ATTN TECH: CALL SPC WHEN READY TO WIRE ON DUE DATE**
*     RMK0  ARC TIMESTAMP 10-26-2009 19.02.54 A 03
*     RMK9  10-28-09 CAE BY RPBT P UUV5715
* I WKBY  94208
*     CLRT  0930
```

5 DAY DUE DATE

- All Bonded Orders are written with 5 day due dates to allow appropriate time for pair grooming
- In this example the service was ordered on 10-23-09 and installed on 10-29-09.

BONDED ORDER KEYWORDS

- \BONDED - Indicates this is bonded order and routes order to appropriately skilled technician
- \FULL INSTALL – All Bonded orders are full installations
- \INSTALL SPLITTER – All Bonded orders require that a splitter is installed at the premise

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```
 - S&E
 O 1     FHSD50M(2RB)/RTN 702 614-0394/ACCT 95394100/RATE 10.00
         /DES2 SELF INSTALL/DES3 0109/DES4 960/ACR X
 O 1     FHSISTH(2AB)/RTN 702 614-0394/ACCT 95361011/RATE 64.94
         /DES1 EMBARQ/DES4 960/ACR X/XSRC SYN
 O 1     AHSVAS(50M)/RTN 702 614-0394/ACCT 95392206/RATE 0.00
         /DES1 VAS BUNDLE/DES4 960/ACR X
 O 1     FHSDHCS(50M)/RTN 702 614-0394/ACCT 95394106/RATE 0.00
         /DES1 DYNAMIC/DES4 960/ACR X
 I 1     AAAIWMA(RSL)/RTN 702 614-0394/DES4 EOI
 I 1     FHSB015(3RB)/RTN 702 614-0394/DES2 FULL INSTALL/DES3 1009
         /DES4 EOI
 I 1     FHSISFL(3AN)/RTN 702 614-0394/XSRC SYN/DES1 EMBARQ
         /DES4 EOI
 I 1     BHSSPMD(DD)/RTN 702 614-0394/DES3 1009/DES4 EOI
 I 1     AHSVAS(50M)/RTN 702 614-0394/DES1 VAS BUNDLE/DES4 EOI
 I 1     FHSDHCS(015)/RTN 702 614-0394/DES1 DYNAMIC/DES4 EOI
 I 1     AAAREBT(09Q)/RTN 702 614-0394/DES1 HSI PROMO UPGRADE
         /DES4 EOI
* I 1     UPR1/CKT 702-614-0394-BOND/HSN 000057/DIR E/SNM BASIC/TYP RD
*         /UNIT B/FRAC BND/COMM HEND/ST NV/EXCH LVGS/COM HENDERSON
*         /ZIP 89015-7230
* I 1     AASDM15/CKT 702-614-0394-BOND
```

S&E SECTION

- FHSB015 – S&E Code indicating Bonded HSI
  - "B" equals Bonded
  - "15" indicates this is a 15Meg customer
- BHSSPMD (DD) – S&E Code for the Cisco DDR2200 Gateway. The DDR2200 is to be installed for all Bonded HSI orders.

```
 - ASGN
 I C001  /CKT 702-614-0394-BOND/WRC HDNV/COS 98/IZ HD02/TZ 5/SC 1/DEV D
 I D001  /CKT 702-614-0394-BOND/WRC HDNV/DSLAM HNSNNVXFL40/SHELF 001
         /CARD 003/PORT 00010/VPI 0656/VCI 0048/MEDR 000015001
         /AIDR 000015001/AGGR LSVGNV80V14/VERT 112.0004/ASLOT 009
         /APORT 00001/AVPI 0656/AVCI 0048/RTID HNSNNVXFL40
 I F001  /C001/CA 13/PR 1198/BP 00098/TER 215784/TLOC BASIC & WATER ST
 I F002  /C001/CA 27K/PR 0232/BP R-O/BC W-BL/TER R59 E BASIC RD
 I MISC  /C001/HSN 000057/FRAC BND/DIR E/SNM BASIC/TYP RD/UNIT B/COMM HEND
         /EXCH LVGS/ST NV
   INFO  /RMK USE VACANT FACILITIES
         /RMK CHANGE SERVICE WITH HIGH SPEED DATA
 I C001  /ATN 702 614-0394/WRC HDNV/COS 21/SW 7P/LT HOST18 0 01 28/PTY 1
         /TR SL/SNCL HNSNNVXFDS0/IZ HD02/TZ 5/SC 1/DEV D
 I       /LM PORT 9-10
 I D001  /ATN 702 614-0394/WRC HDNV/DSLAM HNSNNVXFL40/SHELF 001/CARD 003
         /PORT 00009/VPI 0656/VCI 0044/MEDR 000015001/AIDR 000015001
         /AGGR LSVGNV80V14/VERT 112.0004/ASLOT 009/APORT 00001/AVPI 0656
         /AVCI 0044/RTID HNSNNVXFL40
 I F001  /C001/CA 13/PR 1181/BP 00081/TER 215784/TLOC BASIC & WATER ST
 I F002  /C001/CA 27K/PR 0231/BP R-BL/BC W-BL/TER R59 E BASIC RD
 I MISC  /C001/HSN 000057/DIR E/SNM BASIC/TYP RD/UNIT B/COMM HEND
         /EXCH LVGS/ST NV
   INFO  /RMK REUSE FACILITIES FOR OUT AND IN ACTIONS
         /RMK CHANGE PORT FOR HIGH SPEED DATA
         /RMK 10-26-09 BTAP RMVL RQUST SUBMTTD UUV1236 5:00P
         /RMK \FA VIEWED
 O C001  /ATN 702 614-0394/WRC HDNV/COS 21/SW 7P/LT HOST18 0 01 28/PTY 1
         /TR SL/SNCL HNSNNVXFDS0/IZ HD02/TZ 5/SC 1/DEV D
 O D001  /ATN 702 614-0394/WRC HDNV/DSLAM HNSNNVXFH00/SHELF 001/CARD 003
         /PORT 00022/VPI 0010/VCI 0175/MEDR 000015001/AIDR 000006109
         /AGGR LSVGNV80V07/VERT 112.0001/ASLOT 013/APORT 00001/AVPI 0010
         /AVCI 0175/RTID HNSNNVXFH00
 O F001  /C001/CA 13/PR 1181/BP 00081/TER 215784/TLOC BASIC & WATER ST
 O F002  /C001/CA 27K/PR 0231/BP R-BL/BC W-BL/TER R59 E BASIC RD
 O MISC  /C001/HSN 000057/DIR E/SNM BASIC/TYP RD/UNIT B/COMM HEND
         /EXCH LVGS/ST NV
   INFO  /RMK DISCONNECT FACILITIES DCOP
         /RMK DISCONNECT SERVICE WITH HIGH SPEED DATA
```

ASSIGNMENT SECTION

- **TWO C001 SECTIONS**
- Provides customer telephone number
- 2nd pair indicated by keywords CKT & BOND
- Provides LEN Assignment
  - LT HOST 18
- **TWO D001 SECTIONS**
- Provides SHELF/CARD/PORT
  - SHELF 1, CARD 3, PORTS 9 & 10
- **TWO F001 SECTIONS**
- Provides Cable & Pair information

NOTE: Besides **BHSSPMD(DD)**, the other S&E code for the Cisco DDR2200 gateway is **BHSCISS(xxx)**

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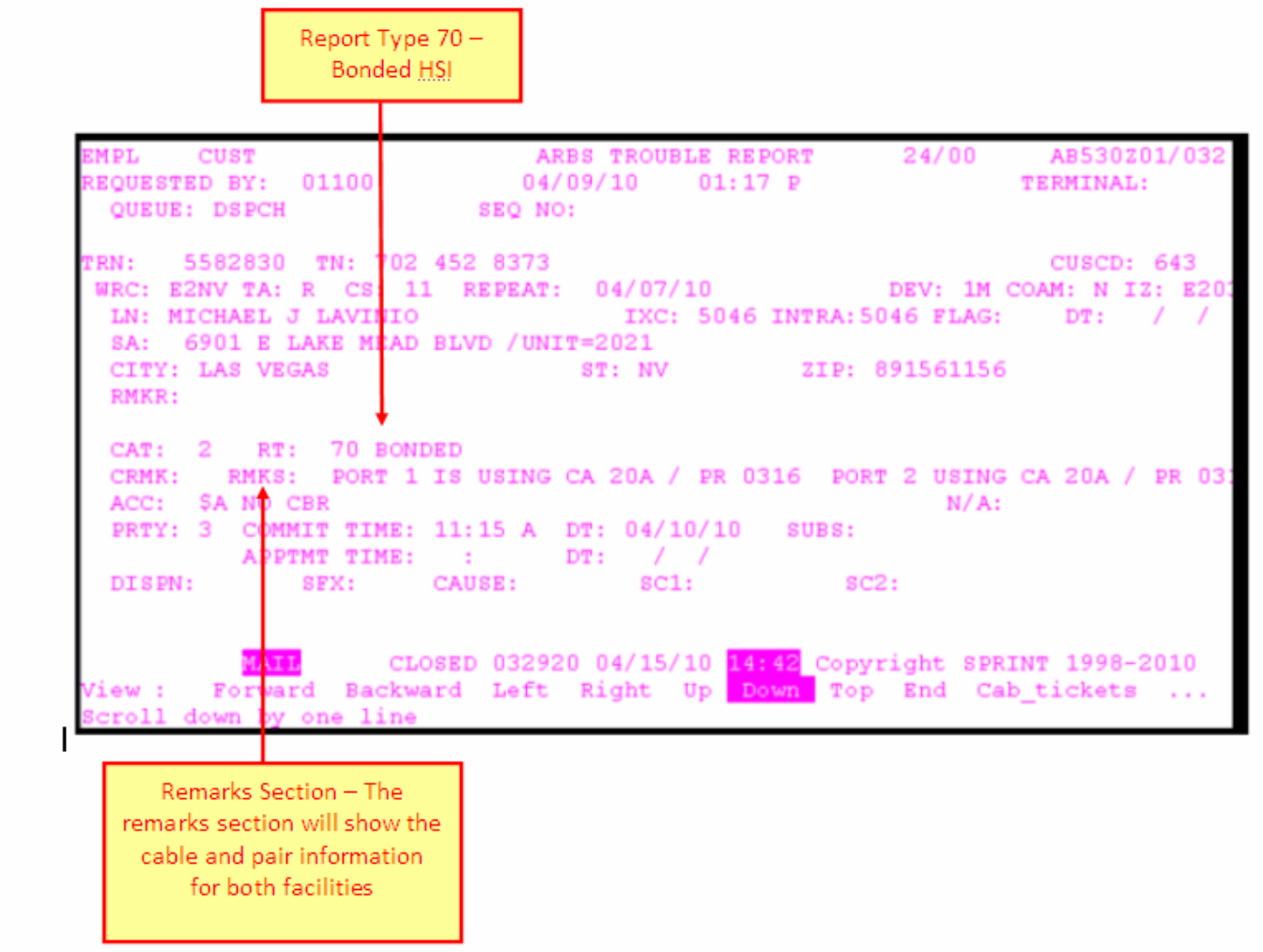
15.2 TROUBLE TICKET EXAMPLE:

Below is an ADSL2+ Bonded HSI Trouble Ticket example. Bonded HSI troubles will be dispatched via Report Type 70. Facility information for both pairs is to be provided within the remarks section of the trouble ticket.


Report Type 70 – Bonded HSI
EMPL CUST ARBS TROUBLE REPORT 24/00 AB530Z01/032
REQUESTED BY: 01100 04/09/10 01:17 P TERMINAL:
QUEUE: DSPCH SEQ NO:
TRN: 5582830 TN: 702 452 8373 CUSCD: 643
WRC: E2NV TA: R CS: 11 REPEAT: 04/07/10 DEV: 1M COAM: N IZ: E20
LN: MICHAEL J LAVINIO IXC: 5046 INTRA:5046 FLAG: DT: / /
SA: 6901 E LAKE MEAD BLVD /UNIT=2021
CITY: LAS VEGAS ST: NV ZIP: 891561156
RMKR:
CAT: 2 RT: 70 BONDED
CRMK: RMKS: PORT 1 IS USING CA 20A / PR 0316 PORT 2 USING CA 20A / PR 03
ACC: $A NO CBR N/A:
PRTY: 3 COMMIT TIME: 11:15 A DT: 04/10/10 SUBS:
APPTMT TIME: : DT: / /
DISPN: SFX: CAUSE: SC1: SC2:
MAIL CLOSED 032920 04/15/10 14:42 Copyright SPRINT 1998-2010
View : Forward Backward Left Right Up Down Top End Cab_tickets ...
Scroll down by one line
Remarks Section – The remarks section will show the cable and pair information for both facilities

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16.0 DENIAL/DOWNGRADE PROCESS

If service cannot be provided to the customer and the order must be denied or downgraded, follow the steps below. Furthermore, the previous service must be reinstalled, if applicable.

If the previous service is to be reinstalled:

If order is	Then
N	Leave new pairs wired.
C – 2 new pairs are used	Leave new pairs installed up to the NID.
C – 1 new pair and 1 original pair used	Leave jumpers at central office for new install. Return previous service.

Note: If another ticket is required, follow local process.

There are five reasons an order may be denied (by pre-field technician and/or installation technician):

1) **NOT MARKET READY** - Service was sold in error and will not be available anytime in the near future
2) **ERRORS ON LINE** - Line condition that cannot be resolved and does not allow for delivery of requested service
3) **LOOP LENGTH** - Loop length or MEDR is less than the minimum required for IPTV service (Loop length maximum of 10,000 feet; MEDR minimum of 8000)
4) **RECORDS INCORRECT** - Facility records are incorrect/customer current facilities cannot support IPTV or Bonded HSI service
5) **CUSTOMER REASON** - Example: customer or landlord does not allow exposed wiring around outside of building therefore service cannot be provided to location or customer does not want to dig a trench to install the drop.

The following is a high level overview of the denial/downgrade process for installers:

Step	Action
1	Installation technician calls Facility Assignment (FAL) team to advise order must be downgraded or denied and provides specific reason.
2	FAL places \DENIED on order, with specific remarks about denial/downgrade per field tech and \HSD ATTN with appropriate remarks so that Offline Sales Support can make customer contact.
3	Offline Sales Support makes customer contact, advises service is being denied or if can get a lower speed; makes necessary order changes or cancels order.
4	If revised order is submitted and facilities change, FAL will enter a new Pre-field ticket. If facilities do not change, a second Pre-field ticket will not be needed.
5	If revised order is submitted that requires an Installation technician, the order will get dispatched business as usual.

17.0 CUSTOMER UPGRADE / ORDER CHANGE PROCESS

If customer wishes to make changes to their order during the installation (i.e. upgrade or downgrade speed) the technician would contact Service Delivery for assistance. Contact numbers can be found in the Resources section of this M&P.

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18.0 CUSTOMER CANCELLATION PROCESS

If order needs to be cancelled because the customer does not want the service, refer the order back to Dispatch via your handheld, business as usual, with appropriate remarks indicating customer wants order cancelled.

19.0 NO ACCESS POLICY

If a customer is not available for the installation appointment, refer the order back to Dispatch with appropriate remarks indicating no access/rescheduling needed. Dispatch will refer the order to Customer Service/IRC who will then make customer contact to renegotiate and reschedule the appointment.

20.0 TIME CODING

Technicians must use the following Activity Type when coding time associated with any type of HSI Installation at the customer premises:

Activity Type	Description	Note
1206	HSI In-Home Install	All premise installation work for HSI

21.0 RESOURCES

Resource	Call this number if...	Number
Service Delivery (Bonded HSI Assignment & Provisioning)	...working on a Bonded HSI Service order	**(800) 452-0535**
Broadband Maintenance Center (BMC)	...working on a Bonded HSI Trouble task	**(800) 603-8044 Option 3,1**
Customer Technical Support (IDS Group)	(For customers only, residential & business)	**(877) 707-3847**

22.0 CONTACTS

Questions regarding the content of this document should be directed to the following:

Author	SME	Name	E-mail Address	Telephone Number
X	**X**	Martinez, Rosa	rosa.a.nunez@centurylink.com	407-889-1454
X	**X**	Creech, Jason M	jason.m.creech@centurylink.com	407-814-5034

23.0 AUTHORIZATION

Questions regarding the authorization of this document should be directed to the following:

Name	E-mail Address	Telephone Number
Kimberly Irenze	kimberly.d.irenze@centurylink.com	702-244-3906

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24.0 APPENDIX

24.1 Gateway Placement Information

Gateway Placement Information.doc

25.0 GLOSSARY

ADSL2+ Bonding	In January 2005 the ITU approved the G.998.1 (G.Bond-ATM) standard, which allows to electronically bond several ADSL2/2+ links using cooper phone lines, in order to increase bandwidth and achieve ultra high data rates.
Bond	Electrical interconnecting of components or segments of telephone plant, such as interconnection of two strands, two or more cable shields, or strand to cable.
dB	The decibel (dB) is a unit of measure associated with signal strength, usually the relation between a transmitted signal and a standard signal source.
dBm	dB ratio referenced to one milliwatt (mW). The output power of a signal referenced to an input signal of one milliwatt.
Filter	An electrical device that transmits a select range of frequencies while stopping (attenuating) all others. Primarily used to suppress unwanted noise or frequencies.
Ground	A connection between an electrical conductor or metallic equipment component to earth.
HPNA	A technology originally developed to transmit data over phone lines hence the name Home Phone Networking Alliance (HPNA). HomePNA 3.1 is a home networking standards developed for new entertainment applications, such as IPTV, which require consistent high performance over the entire house. The newest products offer data rates up to 320Mbit/s providing enough capacity to carry many High Definition TV (HDTV) and Standard Definition TV (SDTV) video streams over COAX.
Noise	Any extraneous energy that interferes with the normal transmission of information, such as voice or data over telephone circuits.
Residential Gateway	The residential or remote gateway is the DDR2200. It reassembles the two signals into one per G.998.1 protocol and feeds all the STBs and computers in the private home network while communicating upstream with Microsoft MediaRoom.
Signal to noise ratio (SNR)	Measurement of the relative level of noise on a circuit. SNR is the ratio of the usable signal being transmitted to the noise or undesired signal.
Voice band	A frequency range of 300 Hz to 3,200 Hz; generally accepted as the range for voice transmission.
Wireless	Wireless is also known as WiFi. IEEE 802.11n is a proposed amendment which improves upon the previous 802.11 standards by adding multiple-input multiple-output (MIMO) and many other newer features. In the CENTURYLINK® TV installation WiFi comes from a CENTURYLINK Access point connected to the gateway and is transmitted to CENTURYLINK WiFi clients. These clients are in turn linked to the STBs using a COAX connection.

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